NOV 9 1931

FOOD INDUSTRIES

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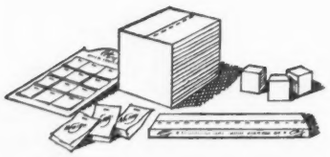
Intimate acquaintance with successful men is a rare privilege, equalled only by intimate knowledge of successful groups of men—successful corporations. + + This study of California Packing Corporation's famous Sacramento Plant No. 11 not only typifies the tools of a successful corporation but shows Calpak at work. It matters not what form of foods the Del Monte label covers—the painstaking care, the expert management, the simplicity with which its huge operations are conducted are an inspiration to all who manufacture quality foods and find happiness in their work.

OCTOBER
1931

SECOND MODEL PLANT NUMBER

COMPANY, INC.
FIFTY CENTS PER COPY



Adopted at once by dozens of firms *when its cost cutting ability was discovered*

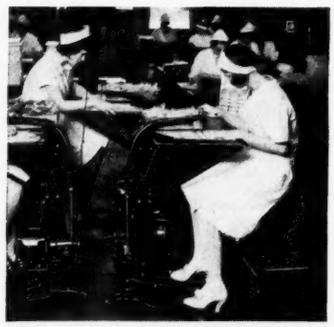
Bostitch has an acceptance throughout the food industries which bids fair to make it the standard method of sealing, fastening and attaching.

In case after case the adoption of the Bostitch method has been instantaneous once its time saving, cost reducing ability was thoroughly explained and demonstrated.

It is simply a question of finding out just where in your packaging, shipping or merchandising department this modern rapid method can be applied. Some of the familiar applications are noted on this page — but a thorough survey of your plant and problems may reveal many other opportunities for economies through special adaptations of Bostitch methods.

We are at your disposal for a study of your problems. Our engineering department will make recommendations on any samples or questions submitted. Bostitch is the world's pioneer and largest producer of stapling equipment. Let us add your firm to the ever growing list of Bostitch users.

ASSEMBLING WINDOW AND COUNTER DISPLAY MATERIAL
With both hands free to hold the material, operators turn out faster, neater work.



ATTACHING MERCHANDISE TO DISPLAY CARDS
Modern merchandising opens unlimited opportunities for Bostitch economies in display board assembly.

SEALING GLASSENE AND CELLOPHANE CONTAINERS
Sealing cookies in glassene envelopes is but one of many Bostitch applications.

BOX BOTTOMING
Standard throughout the more up-to-date plants, Bostitch staplers and stitchers reduce labor costs and increase output.

BOSTITCH WIRE STAPLING

Sold and serviced the world over by BOSTITCH SALES COMPANY, Plant and Home Office, East Greenwich, R. I.

UNIVERSITY OF MICHIGAN LIBRARIES

VOLUME 3

FOOD INDUSTRIES

NUMBER 10

The Journal Devoted to the Problems of the Food Manufacturer

"The First Hundred Years . . ."

IN marking the passage of the third year of the publication of FOOD INDUSTRIES, we extend greetings to all who have made it a possibility.

. . . Producing a magazine which every year will come a little nearer to our ideal of what a food production man's journal should be is not an easy task. It is far more difficult, we have found, than the operation of a factory, for there are no repetitive jobs in publishing. Every issue must be planned long in advance, and "built from the ground up," every month.

. . . Without the aid of our readers and contributors the task would be not merely hard; it would be impossible! Your thoughts, your conversations, and your letters have done much to direct the policies of FOOD INDUSTRIES, for, after all, it is *your* publication. May we know you better in the years to come!

—THE EDITORS.

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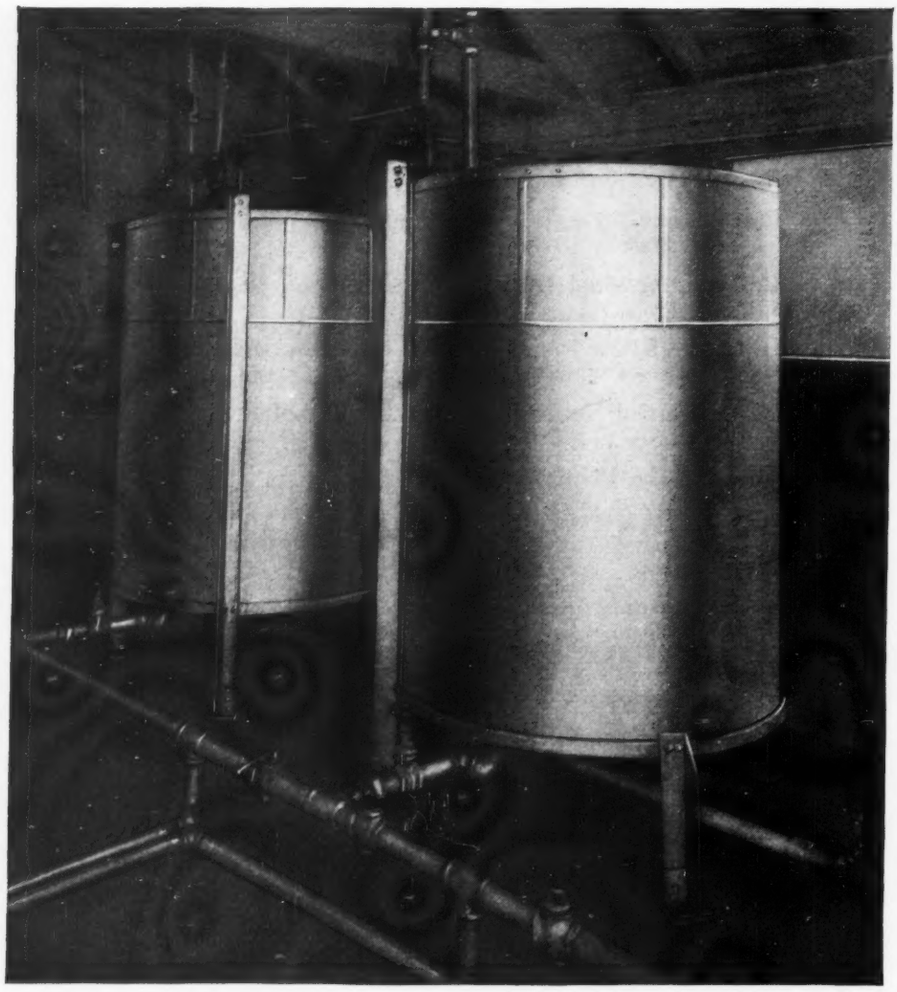


Pure Nickel brine tanks at Hortonville, Wis. plant of Fox Valley Canning Co. Tanks are 350-gallon capacity, equipped with Pure Nickel heating coils. Mfd. by BERLIN-CHAPMAN CO., *Berlin, Wis.*

Pure Nickel equipment gives double protection...

Resists corrosion...does not contaminate the product!

CANNERS of quality food products take no chances in the preparation and storage of brines. They realize that an uninterrupted supply of uncontaminated brine is the safest means of preventing the bacterial action which causes flat sours.

Pure solid Nickel resists the corrosive action of the brine and sugar solutions used in canning. It will not rust. Its bright lustrous surface is easy to keep clean and spotless. It is strong and tough... durable and long wearing. It has no coating to chip, crack or wear off. Because of its rare combination of properties, Pure Nickel helps prevent contamination, discoloration and loss of flavor.

No doubt you can profit by the use of Pure Nickel equipment in your plant. Consult your regular manufacturer or write direct for further information.

Nickel

Send for new booklet, "MODERN IDEAS IN FOOD PLANT SANITATION".

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Food Manufacturers Are Gathering Gold From the Air

Nowhere do air filters serve more varied or more important purposes than in plants where food and drugs are manufactured, and we are continually hearing interesting stories of special problems that have been solved by American Air Filters.

A large manufacturer of gelatine reports that formerly they had little control over contamination, but, since installing American Air Filters, they can assure users of uniformly clean gelatine.

A nationally known drug manufacturer uses American Air Filters to purify the 7,200 cubic feet of air drawn into drying ovens every minute. American Air Filters are also used in the bottle drying ovens to insure perfect hygienic cleanliness in the packaging as well as the making of the product.

From other sources we learn how American Air Filters remove the bacteria that are always present in unfiltered air, and eliminate mould spores that settle on the product and destroy both its purity and its keeping qualities.

Food and drug manufacturers know that the problems of contamination must be solved at *any* cost. By solving these problems at moderate cost, American Air Filters are serving the needs of modern business. In addition to insuring high standards of product purity and uniformity, American Air Filters perform many services which enable them to pay for themselves. They protect the health and efficiency of employees. They prolong the life of machinery and equipment. They reduce maintenance costs.

The American Air Filter Company is ready at all times to give you particulars that will show you how our service can be made profitable to you. Our engineering staff is at your service without obligation.

Gold out of the Air....

AMERICAN AIR FILTERS

A FOUNTAIN PEN MANUFACTURER uses an Airmat Dust Arrester to catch the dust from buffing wheels that polish gold pen points. The filter sheets used in the dust arrester, which cost 4¼ cents, are worth $10.00 each after a few weeks of service, due to the invisible gold dust caught on their surfaces.

Gold out of the air.

A great bank installs American Air Filters in its ventilating system and reduces its cleaning and redecorating costs 37% annually.

Gold out of the air.

In many manufacturing plants, American Air Filters repay the cost of installation by reclaiming valuable dust from the air. They also save their cost over and over by protecting machinery from abrasive dirt, by reducing production costs, by improving quality, and by eliminating the dangerous dust and epidemic germs that threaten the health and efficiency of employees.

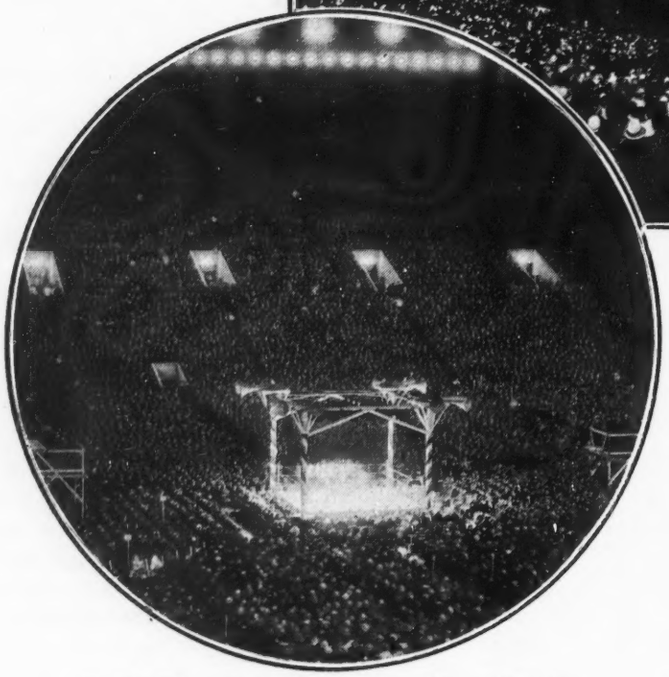
Modern business buildings are installing American Air Filters to protect stocks, equipment and employees from dirt-laden air. Modern hospitals are using them to make the air in every room and corridor as sterile as the surgeon's instruments. Modern schools are raising standards of attendance and scholarship by this sure method of air purification. Even in the home, the small *Airgard* protects fine furnishings, bans noise and safeguards health.

Write for *The Air You Breathe*, thrilling story of the values of dust-free, germ-free air.

AMERICAN AIR FILTER COMPANY, *Inc.*
117 Central Avenue, Louisville, Kentucky
Consult your telephone directory for local address.
IN CANADA, MIDWEST CANADA LTD., MONTREAL

The same Chicago newspaper box office successes shown here *now*

How Tribune Readers Responded to the Chicagoland Music Festival



Partial View of Crowd at Golden Gloves Matches

● More women read the Chicago Tribune than read any other Chicago newspaper. The Tribune has more home-delivered circulation than all other Chicago newspapers combined. General advertisers of groceries recognize the Chicago Tribune as the foremost medium for reaching the women of this rich market. During the first eight months of this year they spent more money in the Tribune than in any other Chicago newspaper.

which sponsored the overwhelming

announces

The CHICAGO TRIBUNE SCHOOL *of* COOKERY

Sixteen Sessions Starting Nov. 3!

More than 115,000 persons jammed Soldiers' Field, Chicago, to see and hear each of the Chicagoland Music Festivals—

More than 40,000 persons sat in the bitter cold in the same gathering place to see the International Golden Gloves Matches, between amateur fighters of France and the United States—

More than 23,000 persons every year pack the Chicago Stadium from skylight to ring to see the semi-final and final boxing matches in the Golden Gloves tournaments—

Other thousands every year attend the Silver Skates Derbies and the Water Carnivals—

Now the same Chicago newspaper which has demonstrated time and again the overwhelming responsiveness of its readers announces the Chicago Tribune School of Cookery.

Four of the city's largest indoor gathering places have been engaged for the sixteen sessions of instruction and lectures.

On four consecutive afternoons starting November 3, the housewives of Chicago's populous South Side will gather at the Trianon ballroom. On four consecutive afternoons starting November 10, the purchasing agents of homes on the North Side will gather at the Aragon ballroom. On four consecutive afternoons starting November 17, food buyers of the great West Side will gather at Guyon's Paradise ballroom.

Then, on the first two days of Thanksgiving week, women from all over the city of Chicago will be invited to attend the final four sessions on the afternoon and evening of November 23 and 24, at the centrally located Coliseum.

Never before has the Chicago Tribune sponsored any kind of cooking school.

This year it will conduct one such as never before has been attempted by any newspaper.

FOOD PRODUCT MANUFACTURERS! ***Decide now to plan a strong schedule of advertising for the Chicago Tribune during the period of this school. Place your sales messages before Tribune readers at the time of peak interest in food and allied subjects, and cash in on the many*** **plus values** ***which will be accorded advertisers in the Chicago Tribune at this time.***

Write, wire or 'phone for a Chicago Tribune man today!

Chicago Tribune

THE WORLD'S GREATEST NEWSPAPER

Eastern Adv. Office
NEW YORK
220 E. 42nd Street

Southern Adv. Office
ATLANTA
1825 Rhodes-Haverty Building

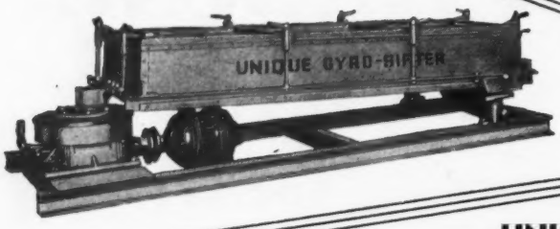
New England Adv. Office
BOSTON
718 Chamber of Com. Bldg.

Western Adv. Office
SAN FRANCISCO
820 Kohl Building

Perfect cogs in the food processing setup--

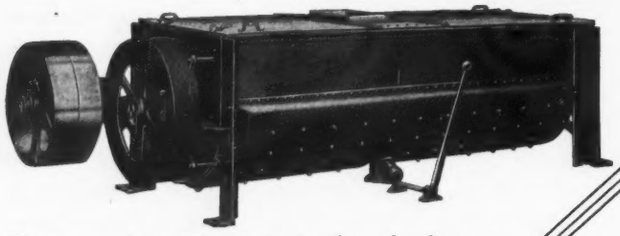
We make these quality sifters in many sizes and types for accurate separations on all sorts of products. They may be combined in compact units with UNIQUE Mixers and Grinders, making an efficient, time-saving setup. These machines help materially in bettering your product and reducing costs.

UNIQUE
GYRO-SIFTERS



UNIQUE
GRINDERS
SIFTERS
MIXERS

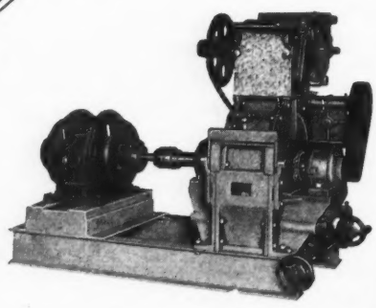
UNIQUE
Made To Order Mixers



There are three "times" to be figured when computing mixing costs:—the time necessary to load and discharge; time required for a thorough mix; and time out for cleaning and repairs. Unnecessary time eats into overhead and production costs—so, by installing UNIQUE Mixers to reduce time on all operations to the absolute minimum, you save the difference.

For the same capacity, UNIQUE Mixers consume far less power than other models. Many Types—Many Sizes.

UNIQUE
GRINDERS and PULVERIZERS



Powerful, compact, efficient mills, adjustable for various degrees of fineness. The Pulverizer shown is of an advanced design for uniformly reducing such materials as chemicals of all kinds, colors, dyes, clays, lime, gums, soaps, soda, sulphur, sugar, salt, spices, etc. Requires no separators, fans or collectors. Results are certain, always. Used extensively throughout the process industries.

UNIQUE
LIQUID
MIXERS

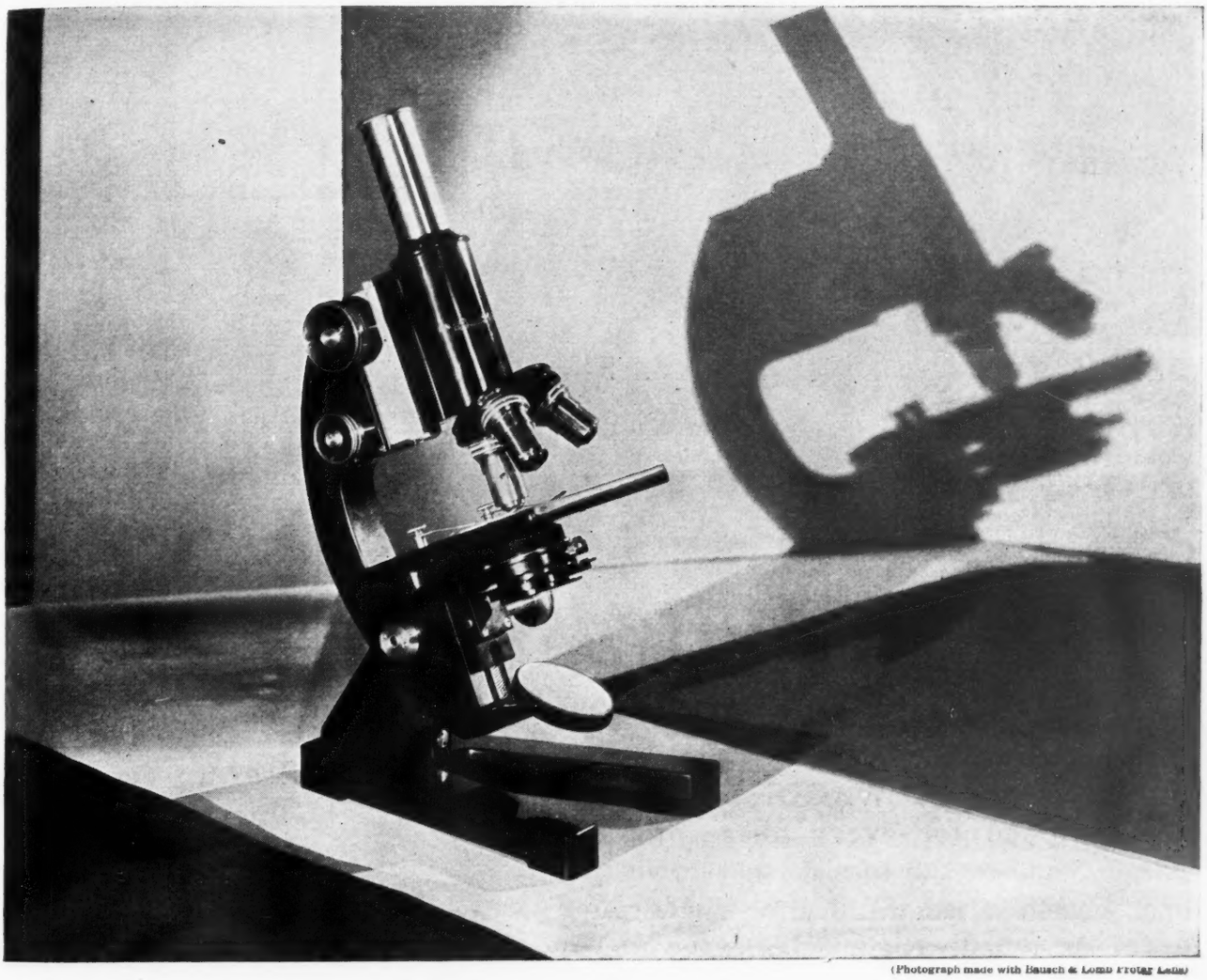
We build special types of Liquid Mixers for a great variety of uses. The machine shown insures speedy dissolution of all lumps and is ideal for syrups, icings and special solutions.

ROBINSON MFG. CO.

71 Painter St., Muncy, Pa.

MANUFACTURERS OF PROCESS EQUIPMENT

Write UNIQUE Engineers for a speedy solution of your processing problems. They will be glad to give you the benefit of more than thirty years of experience in the process industries.



(Photograph made with Bausch & Lomb Protar Lens)

There Is No Substitute for Fact

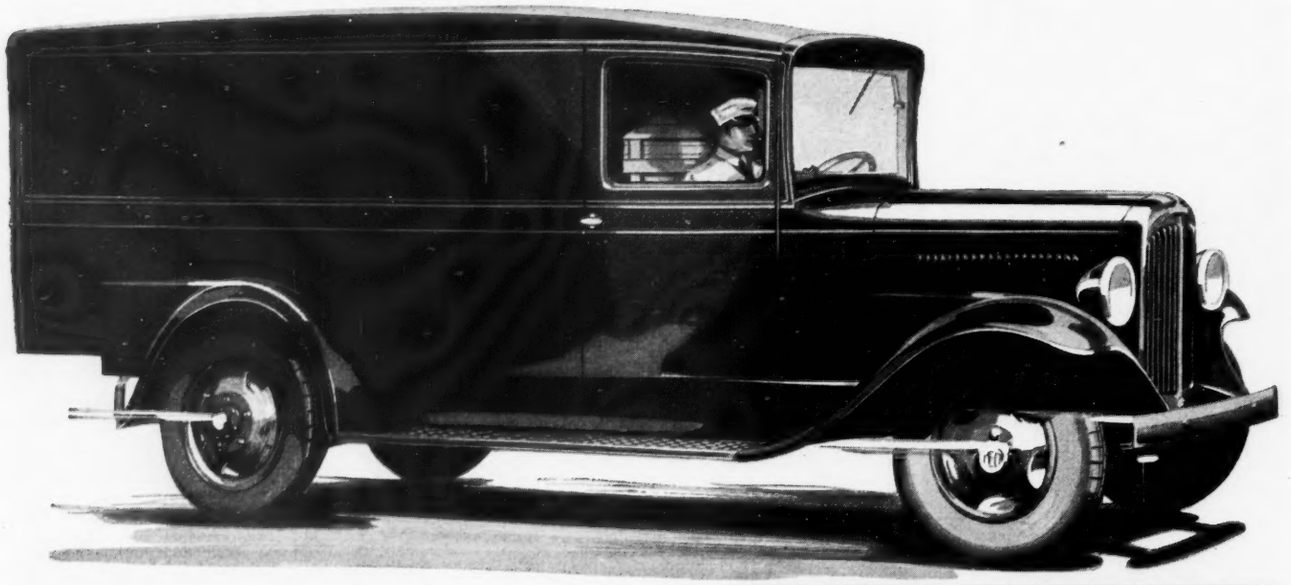
INDUSTRY is finding it profitable to adopt the scientific attitude of mind towards its manufacturing processes. Experience has proved that precision instruments can be used by any intelligent worker, after a little practice, to reveal the *facts* that give exact knowledge of raw materials and manufactured products.

The design of the new B & L Laboratory Microscope GS is especially suited to the industrial laboratory. It has all of the weight and stability of a research microscope, all of the optical and mechanical precision of the finest instruments, yet is well within the price range of laboratory models.

Such accessories as dark field equipment, polarizing apparatus, mechanical stages, stage and eyepiece micrometers, etc., are available from Bausch & Lomb.

Write for complete information. BAUSCH & LOMB OPTICAL CO., 603 St. Paul Street, Rochester, New York.

BAUSCH & LOMB

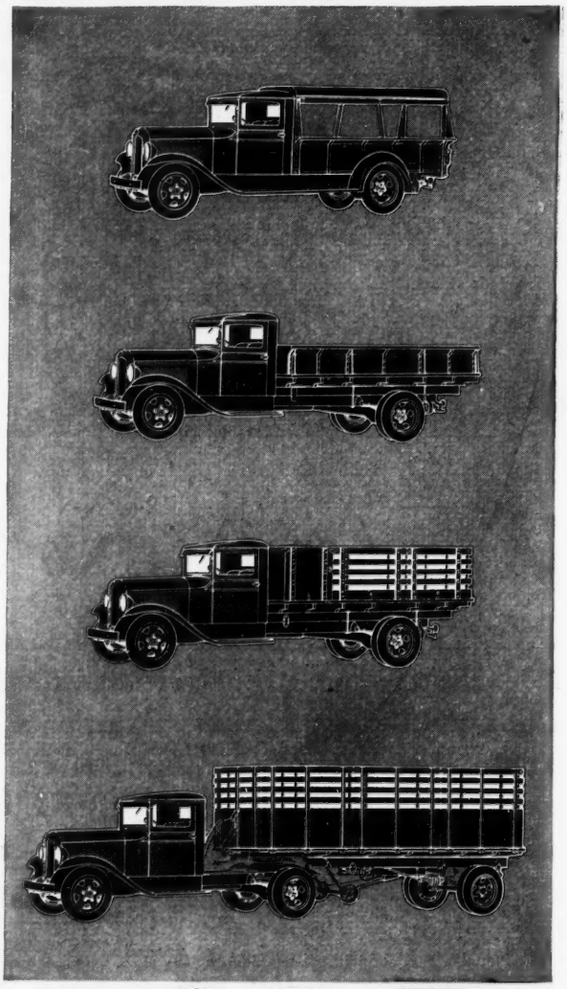


Perfectly Suited for Food Haulage

The low-cost SPEED WAGON may be suitably equipped for every phase of food haulage. Standard and special bodies, two optional wheelbase lengths, dual or single rears, four or six cylinder engines, insure the proper combination of chassis and body for exacting haulage requirements.

See your Reo dealer, or write or wire the Reo factory regarding your specific needs.

REO MOTOR CAR COMPANY
LANSING · TORONTO



THE NEW 1½ TON

REO SPEED WAGON

$625

Four-cylinder $625, Six cylinder $725
Chassis f. o. b. Lansing, Michigan— Dual Wheels $22 Extra

Now

Trademarks for Meat the *New* Sales Stimulant

For years quality-conscious housewives have been buying packaged foods by brand names, and colorful labels and attractive carton markings have played an important part in stimulating over-the-counter sales. But with meats, no appealing method of identification has been possible, and the selection has been left very largely to the discrimination of the buyer or the recommendation of the merchant. Of course, tags, stickers and other temporary forms of marking meats have been tried but without any telling sales effect.

Now, Meyercord has discovered a simple colorful and permanent way of trademarking the skins of summer sausages and other meats. This new method of identification is unlimited as to size, colors or design. Meyercord Fabricals, as these identification marks are known, are applied instantly and permanently to the actual skin and they cannot be removed or defaced without destroying the skin covering.

Their permanence makes it impossible to substitute an inferior product for one of reputation and quality, and their location directly on the meat eliminates any chance of the retail dealer misrepresenting the merchandise he handles.

Then, too, with these colorful Fabricals manufacturers can tie-up their actual products directly and permanently with tasty magazine and newspaper advertisements. And, advertising-minded shoppers, who prefer known brands and known qualities, can make their at-the-counter purchases of meats with the same security with which they buy canned, packaged and bottled goods.

Samples and application demonstrations are available to you without cost.

34
TRADE MARK
CHAS.
HOLLENBACH
INC.

MP
FAB-RI-CAL

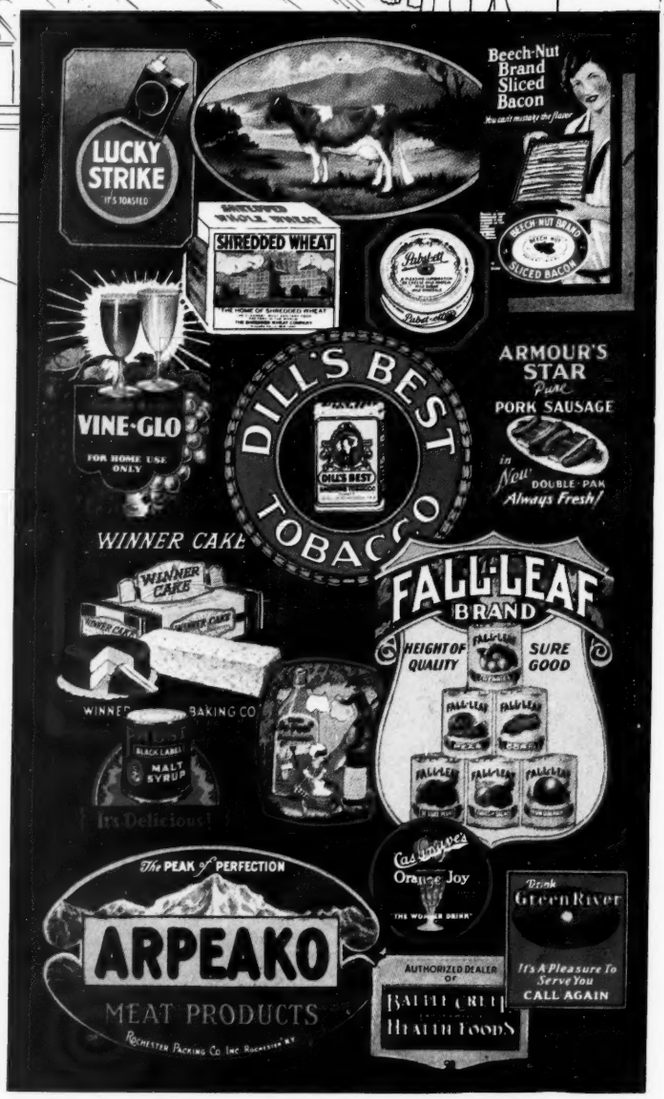
THE MEYERCORD COMPANY
120 SOUTH LA SALLE ST., CHICAGO, ILLINOIS

"Am I my dealer's keeper?"

Modern marketing has placed your dealers in a relatively strong and independent position. The number of nationally advertised products competing for their support offers them unlimited opportunity for selection. And the brands they handle are very largely determined by the sales cooperation that can be expected from the manufacturer.

Today the answer to the question, "Am I My Dealer's Keeper?" is emphatically "Yes," if you want to keep your dealers.

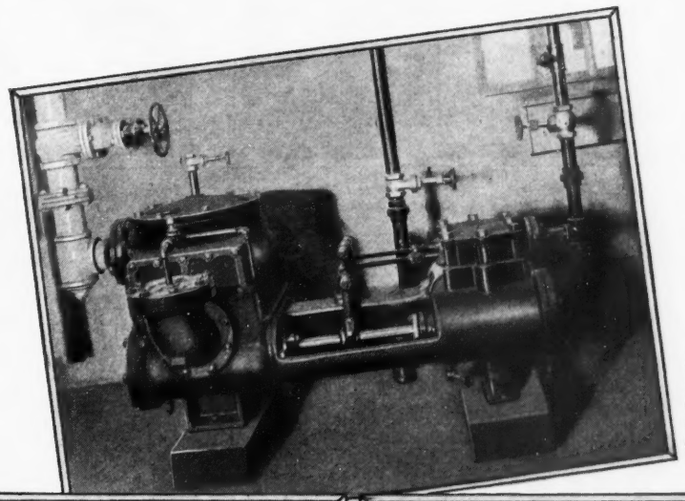
One sure way to keep dealers is to give them on-the-ground, firing-line support by supplying them with Meyercord permanent Top-of-the-Window or Window signs. Amazing results can be obtained from these effective tie-up advertisements at a surprisingly low cost.



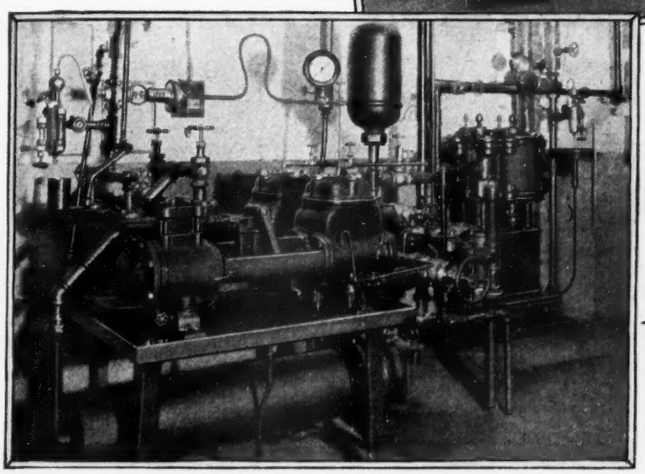
MEYERCORD WINDOW SIGNS

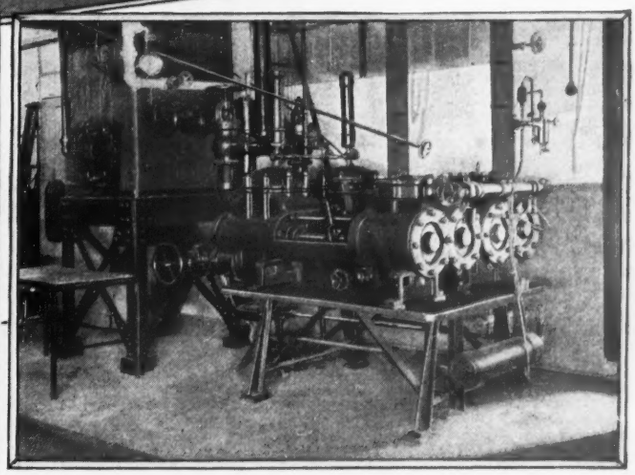
Colorful Day and Night Advertisements

THE MEYERCORD CO., 120 S. LA SALLE ST., CHICAGO



Five of the Worthington Direct-acting Steam Pumps serving Plant No. 11 of the California Packing Corporation, Sacramento, California





At CALPAK No. 11 . . .

Worthington helps maintain production

THE California Packing Corporation, largest fruit and vegetable packers in the world, invests over two and one-half million dollars each year in equipment. The expenditure of such a sum warrants the use of only the most modern machinery . . . which is why Calpak depends on Worthington to help keep operating expenses at a minimum.

In the Calpak plant at Sacramento, responsibility for adequate boiler feedwater and for fuel oil for boilers centers in Worthington units. Incidental equipment includes pumps to handle well water and hot tomato sauce.

Worthington machinery will be found in many other Calpak plants, for this organization serves every branch of the food industries. Worthington engineers will be glad to discuss your problems with you without any obligation on your part. Just write or telephone the nearest office.

PUMPS *All Sizes...All Types For All Services Any Capacity...Any Pressure*	**COMPRESSORS** *Stationary and Portable*
CONDENSERS and Auxiliaries	**ROCK DRILLS**
DIESEL ENGINES	**AUTOMATIC HEAT TREATING MACHINES FOR DRILL STEEL**
GAS ENGINES	**FORGING FURNACES FOR DRILL STEEL**
FEEDWATER HEATERS	**DRILL STEEL**
WATER, OIL and GASOLINE METERS	**ACCESSORIES**
MULTI-V-DRIVES	**CHROMIUM PLATING**

Literature on request

WORTHINGTON PUMP AND MACHINERY CORPORATION

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Executive Offices: 2 Park Avenue, New York, N.Y

GENERAL OFFICES: HARRISON, N. J

District Sales Offices and Representatives:

ATLANTA	CHICAGO	DALLAS	EL PASO	LOS ANGELES	PHILADELPHIA	ST. PAUL	SEATTLE
BOSTON	CINCINNATI	DENVER	HOUSTON	NEW ORLEANS	PITTSBURGH	SALT LAKE CITY	TULSA
BUFFALO	CLEVELAND	DETROIT	KANSAS CITY	NEW YORK	ST. LOUIS	SAN FRANCISCO	WASHINGTON

Branch Offices or Representatives in Principal Cities of all Foreign Countries

P-168

WORTHINGTON

AMERICAN

USS 18-8 STAINLESS

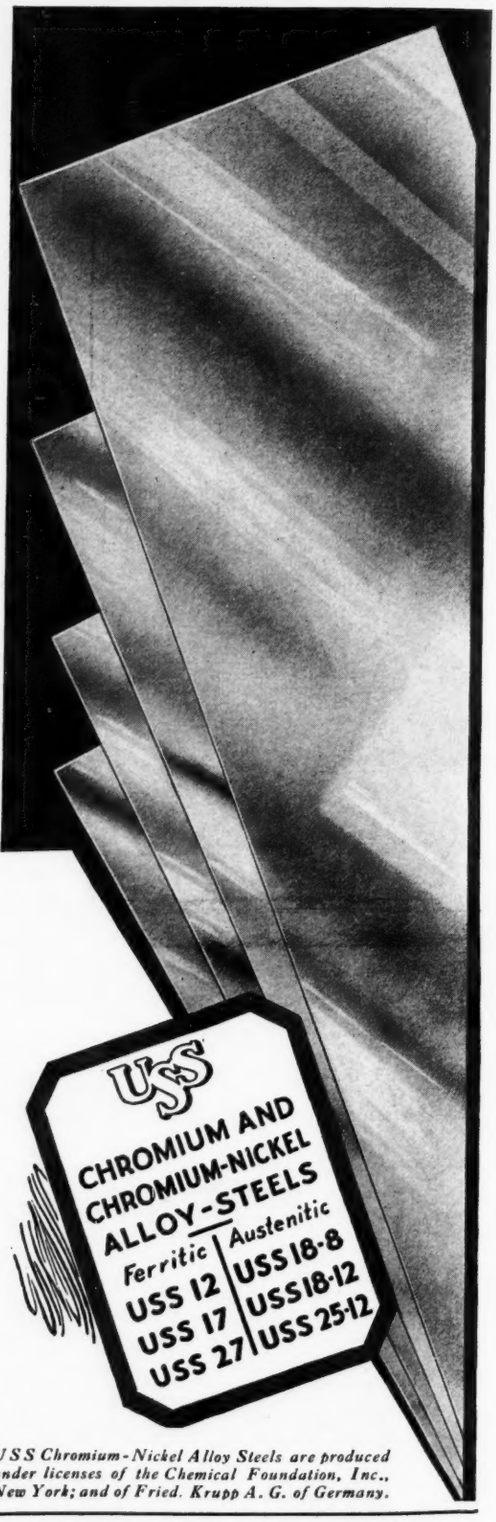
and Heat Resisting Alloy Steel Sheets and Light Plates

Made from Chromium-Nickel Alloy Steel for widest range of applications

For all uses in which appearance and beauty, effective resistance to corrosion, and unusual physical properties are important considerations, USS 18-8 offers widest applicability of all grades of the USS series.

USS 18-8 Stainless and Heat Resisting Steel Sheets and Light Plates are produced by this Company in a moderate range of composition and a number of finishes. Your selection of these products, and other grades indicated in panel opposite, to meet your particular needs may be made with the assistance of our technologists, who will be pleased to serve you.

This Company manufactures high grade sheet and tin mill products for all known uses. Write for full information on AMERICAN Black and Galvanized Sheets, Special Sheets, Tin and Terne Plates; and KEYSTONE Rust Resisting Copper Steel products.



USS Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc., New York; and of Fried. Krupp A. G. of Germany.

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

● Baking is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product

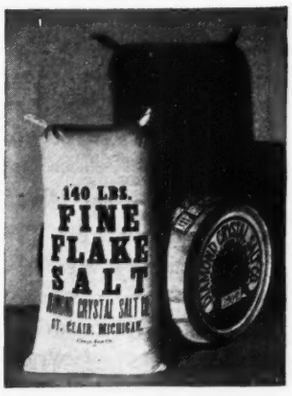
When purer salt went into the bread . . . CAR NO. 4 came back on the route

A CLEVELAND bakery was taken over by new owners. After several months of operation, they found to their dismay that sales were slipping. So many accounts had gone sour that their fourth delivery truck was no longer needed, and was placed in dead storage, pending a return of prosperity.

At last, threatened with even more serious losses, they called in a noted consulting expert to make a survey. Soon he found that practically all their troubles could be traced to impurities in the salt. These impurities had given the bread a bitter flavor. Their sharp taste had made it impossible to use sufficient salt to properly control the yeast action. Bread cells had burst, and the loaves had been blemished with holes.

As soon as this bakery changed to pure salt, Diamond Crystal Salt, an immediate improvement was noticeable in the quality of their bread. Their salesmen took every opportunity to point out to retailers how consistently fine the bread had become. They were able to regain many lost accounts—and now Delivery Car No. 4 is back on the route once more—in fact, often working overtime.

No baker can afford to gamble with the hazards of salt impurities. Why not use pure salt, Diamond Crystal? Its reliable, uniform purity, month after month, shipment after shipment, means greater uniformity both in baking time and fermenting time. This pure salt gives bread a finer flavor. It keeps loaves fresh and moist longer. It is flaked by the patented Alberger process. Diamond Crystal Salt Company, (Inc.). *Bulk Department*, 250 Park Avenue, New York, N. Y.



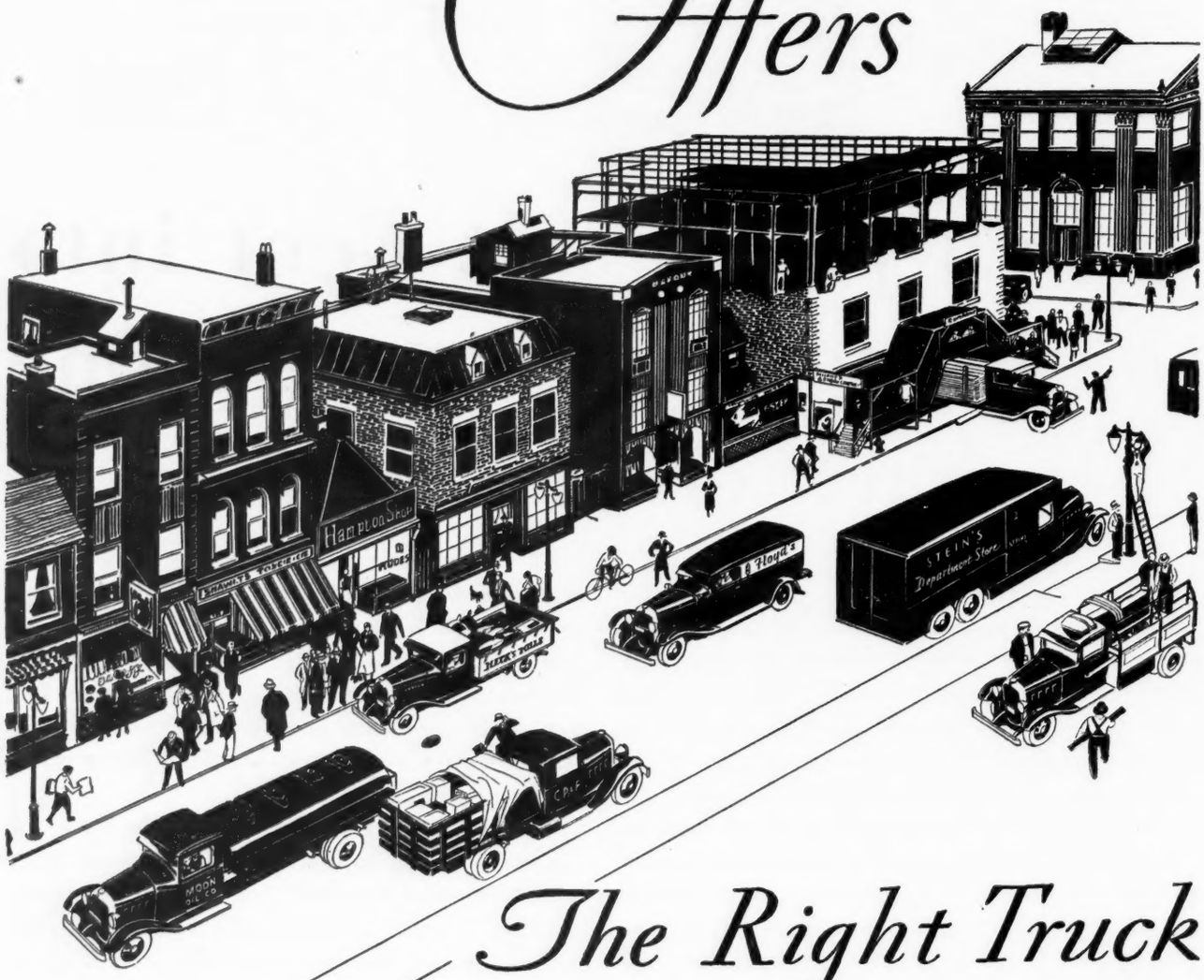
Year in, year out, Diamond Crystal Salt averages 99.9% pure—or better

DIAMOND CRYSTAL SALT

A PRODUCT OF GENERAL FOODS CORPORATION

© 1931, G. F. Corp.

GENERAL MOTORS *Offers*



The Right Truck for Every Purpose

Now you can get General Motors Trucks to fit every kind of hauling job—to fit your own individual requirements exactly. Consider what this means:

Sound quality—proved design

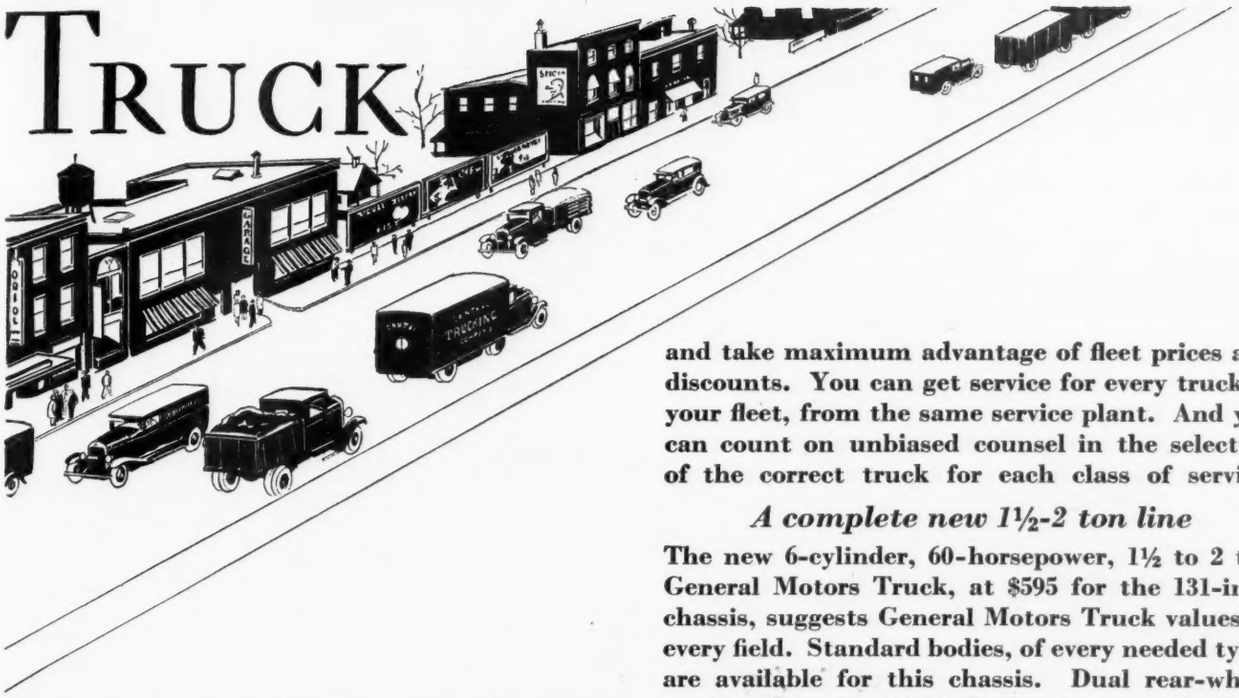
General Motors' name on a truck guarantees quality. The entire facilities of the General Motors experimental and research laboratories are at the command of the engineers who design General Motors Trucks. Each new truck model, each detail improvement, is thoroughly tested and *proved* under actual service conditions on the General Motors Proving Ground.

Low prices throughout the line

General Motors Trucks are outstanding values in every size field. The economies achieved—in purchasing—in manufacturing—in distributing—through the Company's affiliation with the General Motors Corporation, are passed along to the user in lowered prices.

DESIGNED, BUILT, SOLD, SERVICED BY AN

TRUCK



Built by an organization manufacturing commercial vehicles exclusively

General Motors Trucks are designed from radiator to rear axle by engineers who specialize in trucks. They are produced in a modern plant that builds commercial vehicles exclusively. They are sold by truck dealers, serviced by an exclusive truck-service organization.

One responsibility over every truck in your fleet

If you operate more than one type and size of trucks, you will find two-fold value in the completeness of the General Motors Truck line. You can buy all your trucks from the same dealer—and take maximum advantage of fleet prices and discounts. You can get service for every truck in your fleet, from the same service plant. And you can count on unbiased counsel in the selection of the correct truck for each class of service.

A complete new 1½-2 ton line

The new 6-cylinder, 60-horsepower, 1½ to 2 ton General Motors Truck, at $595 for the 131-inch chassis, suggests General Motors Truck values in every field. Standard bodies, of every needed type, are available for this chassis. Dual rear-wheel equipment, and a 157-inch chassis, are optional at correspondingly low prices.

All General Motors Truck models are available in a wide variety of wheelbases, gear ratios, body styles, and tire equipment. The purchase of any model may be financed, at the lowest rates available anywhere, through the Yellow Manufacturing Acceptance Corporation. Chassis prices f. o. b. Pontiac.

LIGHT	MEDIUM	HEAVY
½-ton to 2-ton	2½-ton to 4-ton	5-ton to 7½-ton
$595 to $745	$1360 to $1990	$2565 to $5285

SUPER-HEAVY
8-ton to 15-ton, $5600 and up

GENERAL MOTORS TRUCK COMPANY
PONTIAC, MICHIGAN
(A subsidiary of Yellow Truck and Coach Manufacturing Company)

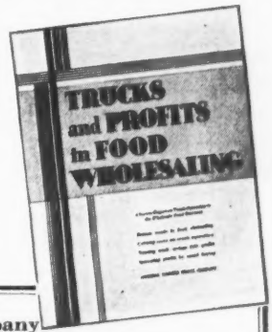
Selecting the Right Truck

Nearly two years ago the General Motors Truck Company started the greatest vocational study of truck operation ever attempted.

Specially trained transportation engineers were sent into all parts of the United States to study truck operations and costs and to report their findings.

Costing thousands of dollars each year, these reports are being prepared for *your* benefit. Helping you make more money in your use of trucks is as much a part of our plan and our job as making and selling good modern trucks. *Each part of this work helps us to do the other part better.* We urge you to take advantage of this service, which is yours without any obligation or cost.

The General Motors Truck representative in your locality is trained to give you this analysis service. Call him in, or mail the coupon for all the facts in booklet form—valuable data that every truck owner can use with profit.



General Motors Truck Company
Pontiac, Michigan
Please send me, without charge or obligation, the booklet on General Motors Vocational Analysis Service, on truck operation in the food industry.

Name_____
Firm Name_____
Street_____
City and State_____

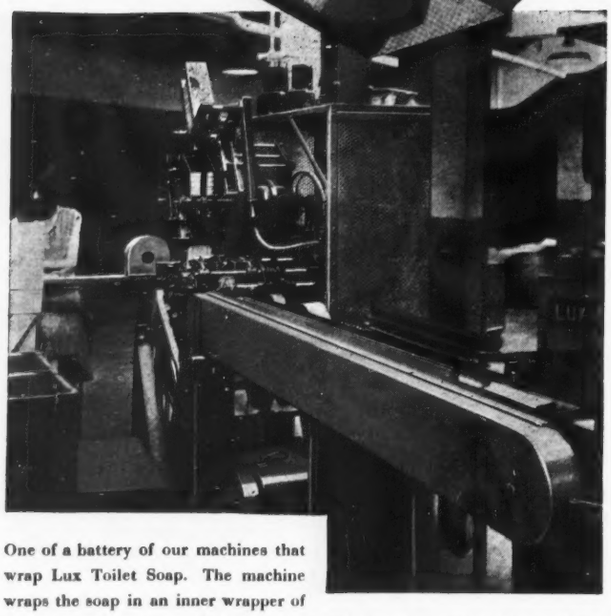
EXCLUSIVE COMMERCIAL-VEHICLE ORGANIZATION

"I am intended for fastidious women"

says this LUX package

Yet it is produced at extremely high speed

(150 per min.)



One of a battery of our machines that wrap Lux Toilet Soap. The machine wraps the soap in an inner wrapper of glassine; folds a piece of cardboard around the cake, and seals the whole in a printed wrapper – 150 cakes per minute.

A PACKAGE of Lux toilet soap literally says "I am intended for fastidious women." The design of the wrapper follows the motive of her tiled bathroom, and the wrapping is so smooth and neat, one cannot help but feel that here indeed is perfection expressed in soap.

To examine this fine package you would hardly believe that it could be produced at the rate of 150 cakes per minute. Yet that is the speed at which our soap wrapping machine works.

The machine wraps an inner glassine wrapper around the soap, folds a piece of cardboard around the cake, and encloses the whole in a printed wrapper, folding and gumming the flaps. All of these operations are performed with such lightning like rapidity that the eye is absolutely incapable of following them, although the mechanism is in full view.

High speed is an important factor in keeping production costs at a minimum. And, of course, a fine looking package is a great sales help.

"Packages that sell, produced at low cost." This is what every package goods manufacturer wants, and it is our business to give it to him—whether he makes soap, food stuffs, cigarettes, candy or any other product that can be sold in a package.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS
New York Chicago Los Angeles
London: Baker Perkins, Ltd.

PACKAGE MACHINERY COMPANY

Over 150 Million Packages per day are wrapped on our Machines

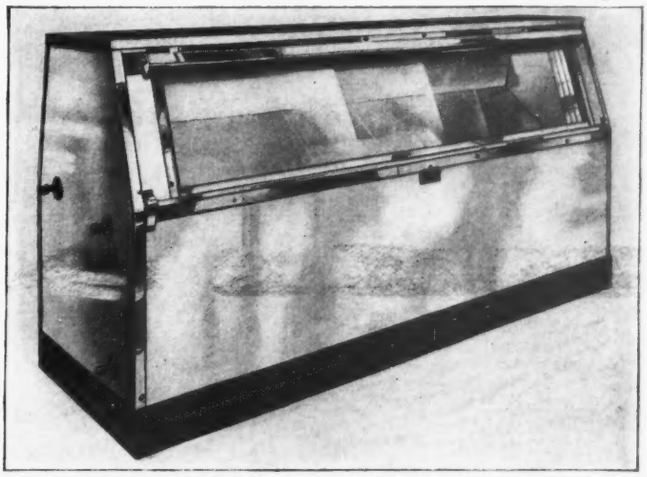
Efficient arrangement gives easier handling. Rear view of the Hill Display Case.

Armstrong's Corkboard guards display case approved by leading distributor

COMPLETE approval has been awarded this Hill Display Case by a leading distributor of quick-frozen products. After thorough tests, this distributor announces that it is completely *safe* for frozen foods.

The Hill case is insulated with Armstrong's Corkboard. Hill, like other manufacturers of commercial refrigerators, has proved cork the safe insulation. Cork's thermal conductivity is low. The cabinet insulated with Armstrong's Corkboard is economical to operate. More than that, cork resists moisture. Properly sealed, it lasts through years of the hardest service. And its rigid strength stands the vibration of slamming doors without settling.

To cork's recognized efficiency, Armstrong's new Type LK Corkboard adds the advantages of exceptionally light weight and lower conductivity. Its coefficient of thermal conductivity is only .263 B.t.u. per square foot, per inch thickness, per degree Fahrenheit temperature difference, per hour, at 60°F. mean temperature.



Frozen foods are safe in this commercial display case, insulated with Armstrong's Corkboard. Made by C. V. Hill & Company, Trenton, N. J.

We will gladly tell you more about how Armstrong's Corkboard provides safe insulation for low temperature cabinets. And we'll send you samples of the new Type LK board if you wish to make tests. Armstrong Cork & Insulation Company, 948 Concord St., Lancaster, Pa.; Canadian offices in Montreal, Toronto, and Winnipeg.

Armstrong's (A) Product

Armstrong's TYPE LK Corkboard Insulation

EFFICIENT AND PRACTICAL INSULATION FOR REFRIGERATING EQUIPMENT

Canned Shrimp . .

WHATEVER appetizing use the hostess has planned for your product, she must be assured of a PERFECT can of shrimp. If she doesn't get it—it's no easy job to get her to try canned shrimp again. No sea food calls for higher standards of packing—none is more delicious when it is packed just right. But shrimp simply doesn't lend itself to appetizing uses if quality has been neglected in the slightest degree. Consistent quality is the one best bet for future sales.

With canned shrimp, quality means a little extra care in canning methods—in the proper selection of equipment. The canner whose goal is a high quality brand accepts only fresh shrimp that are well iced. He guards against even slightly aged shrimps knowing they break up when packed with brine. He handles these promptly—piles them loosely in the blanching baskets so that they will curl properly. He sees to it that the blanching water is boiling when the baskets are placed in the tank. This doubly insures a proper curl. In his cannery he never uses copper coils. He thoroughly investigates every possible development that presents an opportunity for a higher quality product, such as C-enamel Cans and Vacuum Packing—factors that are proving their great value in many of the nation's leading canneries.

The American Can Company is solidly behind canners who are seeking better quality. Shrimp canners who have a specific problem are urged to get in touch with our research department which will gladly cooperate.

AMERICAN CAN COMPANY CANCO

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....Established 1928—McGraw-Hill Publishing Company, Inc.....Number 10

NEW YORK, OCTOBER, 1931

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Laurence V. Burton, Editor

Calpak at Work

CONSTANT STUDY of the processes of food manufacturing, as contrasted with the foods themselves, needs an occasional integration to show how the many unit operations fit into the organized scheme of production—a need which is satisfied by the model plant issues of *Food Industries.*

EVEN as it requires a view of the finished building to be able best to appreciate the art of the skilled trades who erected it, so also does the food engineer need to see the coordinated unit operations in the successful plant to obtain the fullest comprehension of their utility. On this occasion *Food Industries* has chosen a famous plant of one of the best known food companies in the world to exemplify integrated manufacturing operations.

MANY important observations have impressed us in this study of Sacramento No. 11 of California Packing Corporation, the most important of which is superior management. Calpak has grown to its present size by skillful design, not by chance. Good management connotes simplicity and directness of control, both of which are embodied not only in the management functions of corporation and plants but in the equipment itself.

RESPONSIBILITY is delegated to able executives to a gratifying degree, which is not often seen elsewhere. In carrying out their responsibilities they are the final authority. There is no buck-passing in California Packing Corporation, which, one suspects, is one of the cardinal reasons why the C.P.C. is one of the too few smooth-running concerns in this country.

GOOD MANAGEMENT always has good tools and it should be no surprise that all of the many plants of this company, which we of *Food Industries* have been physically able to visit, are most evidently excellent producing units, whether situated in Utah, Illinois, or California. The choice of the plant to study in order to show how Calpak works could have been any one of many which come under the classification of model plants. Plant No. 12, also located in Sacramento, might have served nearly as well. Famous No. 11, which was selected, is one of the largest in the world and has been designed and operated by contributors to these pages.

TO THE EXECUTIVES and men of California Packing Corporation *Food Industries* expresses a deep appreciation of their generous contribution to the knowledge of quality food production.

The California Packing Corporation

—What It Is—

—What It Stands For—

Photo by Boyé Studios

By ROBERT M. BARTHOLD
President
California Packing Corporation

THE name California Packing Corporation is in some respects a misnomer. At least it may tend to convey an erroneous impression, for this company has now grown far beyond the boundaries of any one geographical division and has become world-wide in the scope of its operations. With its subsidiaries it packs in no less than ten different states, three territories, and one foreign country, and its products are sold in almost every civilized land throughout the world.

In another sense, however, our name is most fitting, for the California Packing Corp. had its origin in California's pioneer days; its early growth and development parallels closely the development of this great western state and the bulk of its fruit-canning operations are still in California and probably will continue to be there, thanks to Nature's benign influences in that favored region.

The California Packing Corp., as a corporate entity, was actually born in 1916. Its predecessors, however, represent some of the earliest figures in California's canning history—Dan Prevost, who organized the first commercial packing enterprise in 1854; Francis Cutting, who established the first commercial fruit cannery in the state in 1860; J. K. Armsby, who established the J. K. Armsby Co. in 1865; and many other pioneers of the sixties and seventies.

By the middle of the nineteenth century, the time was ripe for the canning industry, and its rapid growth was foreordained. In California and elsewhere throughout the West, isolated communities had come into being, many of them in mountainous regions remote from

sources of fresh food supply. During much of the year, these communities were entirely dependent on the few foods that could be stored raw, plus "homecanned" or "preserved" foods. Commercially canned foods filled a need that could be adequately met in no other way. The experience of the Civil War also had shown the need for foods which could be stored indefinitely and transported readily from place to place. This had, of course, given added impetus to the development of canning.

As a result of these and other factors, among them the growing trend of population toward great urban centers, California's canning industry grew steadily from the middle sixties onward. In its growth it was favored by climatic conditions within California itself—conditions as remarkable for their diversity and wide range as for sunshine and general equability. Because of these favorable circumstances, it has been possible not only to produce a very wide variety of fruits but, by well-planned location of orchards, to extend materially the ripening and consequently the packing season of almost every one of them.

With the expansion of canning, the number of concerns engaged in the business naturally increased. A group of the more progressive concerns joined hands, in 1899, to form the California Fruit Canners' Association. This organization became the largest single packer of California fruits and vegetables, prior to 1916. In 1901, another group of canners organized as the Central California Canneries. This concern soon took rank as second only to the California Fruit Canners' Association in volume of business. Meanwhile the pioneer, the J. K. Armsby Co., had held its important place in the canning field, while a fourth organization, the Griffin & Skelley Co., organized in 1881, had pushed up into the front rank of canners and packers. Speeded up by these developments, and further augmented by fresh progress in the canning of vegetables, California's canning industry made great forward strides during the first fifteen years of the new century. Meanwhile Hawaii had seen the birth of its pineapple industry, destined to grow from small beginnings to a place of tremendous importance.

In 1916, rapidly expanding markets and increasing sales served to bring California's four major canning factors together—the J. K. Armsby Co., the Griffin & Skeiley Co., the California Fruit Canners' Association, and the Central California Canners—under the name California Packing Corp.

At that time fruits were the most important California canned food items, accounting for about 70 per cent of the state's total pack. This was natural enough, when one considers that California was preeminently a fruit-growing state, and had been famous for its fruits since the days of the early Franciscan monks.

With its now greatly enlarged organization, however, the California Packing Corp. was ideally situated to expand its activities and develop its canned vegetable business. Two vegetables—asparagus and tomatoes—were particularly suited to California conditions. In fact, the bulk of the country's canned asparagus today is grown on California's famous Sacramento River delta lands. It was only necessary, in the case of these two products, to work out details of production, estimate the market, both existing and potential, and proceed to step up the volume accordingly. The same is true of spinach, although it was not until a few years later that the possibilities of this product were realized to any marked extent.

Corn and peas, however, presented quite a different problem. Neither of them is particularly well adapted to California conditions, and it was necessary, if we wanted to undertake large-scale production, to go into other sections where they could be produced to better advantage. This step was taken, and today we operate pea canning establishments in Utah, while both peas and corn are packed in Illinois, Wisconsin, and Minnesota.

Similar conditions led to the establishment of canneries in Oregon and Washington to pack berries and other fruits which grow particularly well in those states. They led also to the location, through the Alaska Packers' Association, of fisheries and fish canneries on Puget Sound, in British Columbia, and in Alaska, where the finest salmon is found. Tuna and sardines are packed in California.

A vast expansion of the company's activities has been made also along other lines. Extensive pineapple interests have been acquired in Hawaii, and experiments with this fruit have been conducted in other parts of the world. A modern plant for grapefruit has been established in Florida, taking full advantage of the mounting popularity of this citrus fruit. Coffee has been added to our line of products, following a long period of research and experimentation. A wide list of other products, suited to our producing and marketing set-up, also has been developed.

Today, the California Packing Corp. takes rank as the world's foremost fruit and vegetable canning organization. This in itself might be considered just cause for pride. However, our pride is not so much in the size of our organization as in the things that have made its size possible.

From the beginning, the California Packing Corp. has built its business primarily on the uniformity of its products and their unquestioned quality. Del Monte and our many other featured brands, including such well-known names as Gold Bar, Sunkist, Glass Jar, and others, are today accepted the world over, both by trade and consumers, as the symbols of finest quality in canned foods. In this accomplishment we can and do take a deep and lasting pride.

Building World-Wide Distribution In Fifteen Years

By ROY L. PRATT
Vice-President and General Sales Director
California Packing Corporation

Photo by Blank & Stoller

THE Del Monte organization and its immediate predecessors have been in the food business for more than 70 years. Our technical knowledge of canned foods, therefore, has an unusual background, extending back to the very beginnings of the canning industry in California. The matter of sales policies, however, is something quite different. Yet I think that here, too, we were fortunate. California Packing Corp., as an individual company, dates from 1916, previous to which its selling activities had been the activities of four separate companies, all competing for the same business. The ideal of a truly national brand, backed by national advertising and universally distributed, was conceived only with the formation of the new company. Del Monte was thus nurtured and developed in one of the most rapidly moving periods in the history of food distribution.

Distribution Methods Changed

To all intents and purposes, 1916 also marks the end of an older type of grocery selling and the beginning of a new era in retail merchandising. Previous to that date, bulk goods were pretty generally accepted. There were very few widely known national brands and there was a great deal of confusion on the part of consumers in all types of buying. The past fifteen years has changed this completely. We have seen the development and growth of nationally known brands in almost every type of merchandising. We have seen the development of chain stores, and more recently the growth of voluntary chains. We have seen the development of a new type of independent grocer, handling his business on the most efficient and up-to-date basis. With these changes we have also witnessed a great widening of the American diet and a rapid increase in the consumption of all canned foods.

At the time of the organization of the California Packing Corp., circumstances were particularly favorable for the launching of a campaign with the object of distributing nationally a single brand of high-quality canned foods. The conditions prevailing in the food field in general were especially evident in the canned-food field. There were many small canners, producing many different grades, and there were, of course, a number of labels of very high quality on the market. But, due to their ignorance of this fact, housewives were not able to select those brands with the same assurance that they enjoy at the present time.

Building Recognition

The Del Monte brand was only one of the leading brands owned by the California Packing Corp. at the time of its organization in 1916. Of equal importance were Sunkist, Gold Bar, and Glass Jar, the featured brands of the other three parts of the new business alliance. All of them had been aggressively sold in different localities, and all were products of superior quality, but the Del Monte brand had at that time a wider distribution than any of the other brands owned by the new corporation. Therefore, Del Monte was selected as the brand on which to concentrate our national campaign. We felt then, and we still feel today, that the chief value any label offers the consumer is assurance in buying. We set out to make Del Monte quality known —to make it a brand which the housewife could buy in any section of the country, in any type of outlet, with an assurance of its uniform dependability, no matter what product it marked.

Advertising naturally was the first step in such a plan. While Del Monte previously had been advertised locally by the California Fruit Canners' Association, the first national advertising campaign under the new organization appeared in April, 1917. Since then, Del Monte advertising has gone steadily forward, increasing as our sales have grown. At the same time, an equal effort has been made to secure the widest possible distribution for this label.

The result of this policy speaks for itself. Investigations made by all types of authorities in all sections of the country—in city, small town, and rural markets—show that the Del Monte brand has a consumer preference of the highest order. The Del Monte brand is now handled by more grocers than any other canned fruit or vegetable label, and our sales, though of considerable volume in 1916, have grown much faster since that date than the increase of volume of canned fruits and vegetables as a class. This has made it possible for the trade to reduce the number of brands carried and so to

(*Turn to page* 418)

Operating Many Plants Presents Few New Problems

By ALFRED W. EAMES
Vice-President and Production Director
California Packing Corporation

AS a company grows, be its business canning, dairying, baking, or milling, the operating problems increase in number and kind, though it cannot be said that they grow at the same rate as does the size of the company. Operating 70 plants is not 70 times the job of operating one; if it were, there would not be many companies willing to have 70 plants. The problems are increased in magnitude, new ones added, some old ones are no worse, and others are less troublesome than in a smaller organization. For instance, the large organization is in a position to benefit by whatever advantages can be obtained from increased purchasing power, by purchases in quantity or during a favorable market.

Again, maintenance problems can be simplified, as in our method of keeping our temperature-control instruments accurate and in good repair. Not only is there a substantial direct money saving in having this service but there is little or no excuse under this system for having inaccurate instruments in plants. Consequently, losses from improperly or insufficiently processed packs are practically eliminated.

Maximum Returns From Machinery

By shifting machinery and equipment from one plant to another, we can obtain increased or extended service from it. A double seamer or cooker that is no longer necessary in one plant can be sent to a plant where it is needed. With a single plant in operation, a machine that is no longer required would not only be in the way but would also be piling up depreciation charges and would be becoming obsolete, or at least obsolescent. By having many plants, we are able to get the most out of some of our equipment during its usable life.

With the increased capital that comes with growth, comes the possibility of investigation into some of the problems which also confront the individual plant, but which that plant cannot tackle because of lack of time, personnel, and funds. We have a research department headed by a food expert who is assisted by an adequate staff of twelve chemists. Our plant operations can be quickly checked and causes of abnormalities in the pack determined. There is time to investigate problems at which a harassed plant superintendent can only swear, during the busy season; problems which might die for want of interest during the off season. Newly conceived products can be experimentally packed; examined bacteriologically and chemically; tested for rate of heat penetration, time and temperature of cook; and everything else done that must be done to a new product before it is ready to put on the market.

On the growing end we operate thousands of acres of ranches and seed farms. We are able to make agricultural and horticultural investigations such as a single plant rarely would be able to do. Experiments toward increasing yields and improving the canning quality of our ranch crops are always going on. Improved fertilizer, irrigation, and cultural methods for fruit and vegetable crops; development of new varieties; these are some of the things that come with growth in size of operations.

Along with these things that are desirable and advantageous comes the problem of allocating the season's pack, of deciding in which plant to pack what and how much, a problem with which the individual plant does not have to concern itself.

Large Organization Advantages

Also, along with the economic advantages of large-scale operation comes the necessity of a large organization and the consequent lessening of personal contact between management and plant-operating personnel. The large organization, however, has its compensations; if it has been properly built up, there is a succession of experience and of keen minds within it that effectively bridges over any loss of direct contact with all the activities of every plant. We have consciously tried to build such an organization. In doing so, the size of the company has been in our favor. We have been able to get desirable types of men, who saw chances for future advancement, for the permanent crews of our canneries, from which foremen are made. From these, as they increase in experience, come superintendents and other executives. An operating organization of the kind that can always keep our many plants going profitably must be built slowly; it cannot be bought ready-made.

The increase in number of plants has been brought about by increased distribution of the finished products

manufactured by them. If the high level of distribution is to be maintained and increased, it sooner or later means additional plants. These expansions may be either in plants for new products, as in the case of our grapefruit canning plant at Tampa, Fla., or additional plants for products already packed, such as some of our corn and pea plants in the Middle West.

While the California Packing Corp. started its activities in California, its plants are now widely scattered over many of the areas that grow canning crops. One of the reasons for this wide dispersal might be called "pack insurance." The climatic range of our plant locations is great enough so that only a nation-wide crop failure would seriously affect our raw-material supply. Another reason is to bring the plants closer to their markets. We pack peas in Illinois, Wisconsin, and Utah. Without our Mid-Western plants, our Utah-canned peas would be at a decided disadvantage in competing with Mid-west-canned peas in Eastern markets. With national distribution, we have to sell peas in Detroit, and by canning them in Illinois, we do not have the extra burden of freight from Utah to Illinois to handicap our product.

When it comes to locating an individual plant, nearness to raw material is fundamental. If this can be combined with ample labor supply, plenty of water, adequate transportation, and all the rest of the governing factors, we have the ideal location. Plant No. 11, at Sacramento, illustrates this; so does our new grapefruit cannery at Tampa, where there is the added advantage of being on the seaboard. In the Central States we have tried to scatter our corn and pea plants so as to get as much climatic range as possible. Weather is a local matter to a high degree in the Middle West; therefore our plants at Sleepy Eye, Minn., and DeKalb, Ill., are not all likely to find their crops ruined at the same time by hail or unseasonable frost.

When operating a string of plants it is desirable to have them uniform in equipment and arrangement, and standardized as to methods, as far as such a thing is possible. By having them so, experience in one becomes applicable in another; when troubles arise in one plant we know where to look for the remedy. It may have happened before in another plant similarly arranged and similarly equipped; it is less likely to be due to peculiarities of a plant unique in equipment, arrangement, and methods. A time-saving, or labor-saving, or trouble-preventing idea worked out in one plant becomes applicable in all of them. For this reason, to maintain uniformity of plants—which experience has shown brings success—additional production generally requires the construction of new plants, rather than the purchase of already existing canneries.

Since no firm is going to expand overnight, the operating manager or director ordinarily will have ample time to grow with his job and meet the new problems as they arise. His most important job will be to build a dependable and capable organization. The new questions of plant location and allocation of pack pretty much solve themselves once all the data are in.

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World-Wide Distribution In Fifteen Years

(Continued from page 416)

cut down capital invested in goods and to secure a more rapid turn of stock. The result has been wide distribution, through both independent and chain-store outlets.

While we have been developing this acceptance and call for Del Monte, there have, of course, been various developments to meet our own production plans. Up to 1926, our main emphasis was placed on Del Monte fruits. At that time the best-known vegetable items were Del Monte spinach and asparagus. In that year we undertook a national campaign on several of the leading vegetables, and since then our vegetable business has made rapid strides, particularly our volume of peas and corn. We have added advertising support on such items as Del Monte tomato sauce.

Early in 1930 we put large-scale advertising back of the introduction of Del Monte coffee, an item that has met with splendid success, due to its quality and the confidence of the consumer in any product packed under our Del Monte brand.

Certain changes have been made in consumer packages to meet modern living conditions and in trade packages to meet the need for more concentrated retail stocks. Whereas the leading fruit container formerly was the No. 2½, or large, can, our fruits are available today in four sizes of containers, the smallest being the buffet, or 8-oz., can. The smaller sizes have produced considerable volume in metropolitan areas, where families are smaller and apartment-house dwellings are more common.

While our sales have been developing it has also been necessary to work out more carefully the organization of sales activities. Except in a few markets, where business is done through our own offices, Del Monte sales to wholesale distributors are handled through brokers. Side by side with this selling organization, we have developed a separate field organization, consisting of eight division sales directors. Under each of these directors are a number of sales supervisors. Our retail salesmen work under the direct control of these supervisors and cooperate with brokers and jobbers in developing business from the jobbing and retail trade.

In addition to its Del Monte distribution, the California Packing Corp. also enjoys a large and growing business packing and distributing several other featured brands, among the more important of which are Gold Bar, Sunkist, Glass Jar, Luxury, and President. Control of these brands is given to a distributor for a certain defined territory. Many distributors who handled these brands prior to the time the California Packing Corp. was organized are still distributing the same brands. Our total volume of business under these brands has increased heavily during the past fifteen years. In addition to the business we do under our own brands we also pack and sell to private label distributors and give to this type of trade the same kind of service and quality. We also have been able to develop a very large volume of foreign business, extending practically into every country on the globe. Particularly intensive work has been done in Great Britain.

As I look back over the past fifteen years, I feel that we have been passing through one of the most unusual periods in food distribution. I feel sure that the sales departments of the seventies, eighties, and nineties had just as many problems as our own, but I question whether they were as interesting or as stimulating as the ones which confront business today.

To Operate or Not to Operate—An Important Decision

By RALPH E. SANBORN
General Superintendent
California Packing Corporation

EVERY firm that has more than one manufacturing plant is likely sooner or later to be faced with the problem of which plants to operate or to what extent to operate any of them. Rarely does a single condition govern a given situation.

Before the beginning of the operating season the total production requirements of the entire corporation for the year will have already been estimated. This will be the first factor to be considered. In the meantime, crop reports have been coming in, indicating the quantities and quality of the canning crops in the different growing districts. A destructive frost may have hit a few localities, making a short crop or a crop not worth canning. Excessive rainfall or lack of rainfall may alter both quantity and quality of any canning crop, and possibly make operations in any given district so unprofitable that it will not be worth while to make a beginning. Early crop reports of the field men are an important factor in making a decision.

With practically all products canned in California, the cannery is in competition with the fresh produce market. About the only exception is the canning clingstone peach, which is not used for any other purpose but canning. On account of this competition from the fresh market, at times the quantity of a given crop available for canning may be small or even non-existent. Thus, at Plant No. 11, apricots are not canned every year, for in the area from which the apricots would be drawn for canning at this plant, apricots ripen earlier than in other districts of the state. Consequently, its fruit is in great demand for the fresh-fruit market and it is only in exceptional years of very heavy crop that any are available for canning at prices that make canning them worth while. Except under similar conditions, the price paid for fruit rarely enters into the decision to operate a plant, since, owing to the way fruit is bought in California, the price is generally uniform, except for premiums that may be paid on extra high quality fruit grown in certain limited areas.

The general status of the industry, both in the growing end and in the marketing end, may have an effect on the decision. For instance, in 1931 there was a large carry-over of peaches from 1930, and at the same time a large fruit crop. In view of the curtailed pack throughout the peach-canning districts, some plants that were equipped only to can peaches, were kept closed to favor those which could pack more than one product, such as peaches and pears. Once they are under way there is not likely to be much change in the status of plants. They are very likely to keep on going, barring unexpected contingencies; and if they are not opened at the beginning of the season it is likely that they will remain closed.

Other things being equal, plants on tidewater or most convenient to railroad shipment are desirable, and this factor may be the deciding one in some cases. Again a proximity to can-manufacturing plants may enter as a factor in the decision. Thus, in Sacramento, cans are made in the same city and it is much cheaper to haul them a few miles around town than it would be to ship a similar carload a hundred miles or so down the valley.

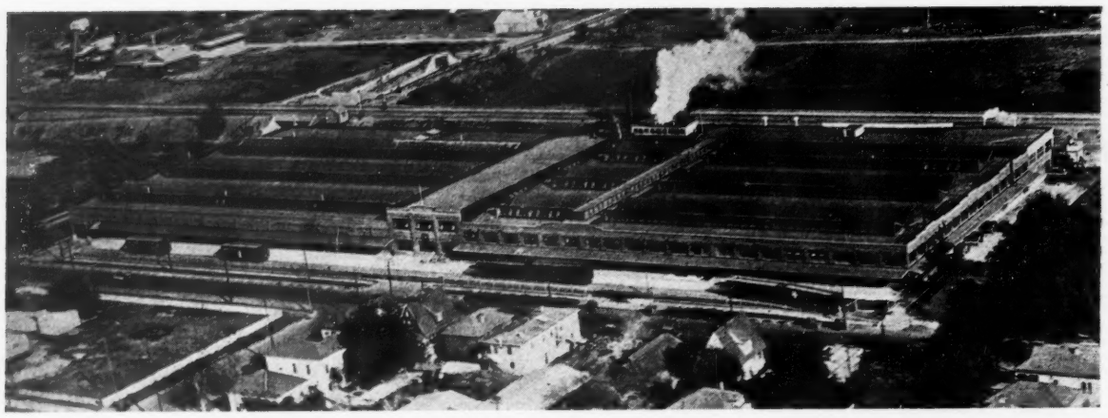
The physical condition of a plant ordinarily is not a factor, provided the plant is equipped to can the product in question. All of our plants at the close of the canning season are immediately put into the best shape possible, ready for the next operating season.

The bare costs of operating the plant are only a minor consideration. This is for two reasons. In the first place, other things may far outshadow the costs; the advisability of maintaining an organization built to operate for a long season, for instance. Quite aside from this, we have endeavored to standardize our plants as much as possible so that the actual operating cost in them is pretty much the same. Total costs do vary, but include, besides the cost of operation, freight on raw material and supplies, and other costs not related to operating efficiency.

Every plant has a capacity at which it is most efficiently run and it should be run at this capacity if possible. This is necessary if a satisfactory working force is to be maintained, for workers, disliking short or irregular hours of work, soon go elsewhere. Incidental and overhead expenses connected with running a cannery are reduced if it is operated at full capacity. These are as great for a thousand boxes of fruit canned as they are for ten thousand boxes. The cost of cleaning up the plant, for example, is no small item either in actual work involved or in expense, yet it is just as much work for the 1,000-box day as for the 10,000-box day and it costs just the same for either. If there is not enough raw material to keep a plant operating at capacity every day, it is better to operate only every other day, but on those days at full speed.

Unless a plant can be kept operating fairly steadily, it is hardly possible to build up an organization to keep it going. During the canning season competition for cannery labor from other canneries, from fresh-fruit businesses, or from farming operations makes it desirable to operate as steadily as possible in order to hold the organization together. Otherwise, the workers will find their way into other employment that is more regular. For these reasons, it is wise to have plants expecting to work on late crops start the season on early crops.

Of all the factors, maintenance of organization is most important. Among several plants similarly equipped, but all of which cannot be operated on account of crop shortage or for other reasons, that plant should be operated which can have a season long enough to repay the trouble and expense of organizing an efficient crew to operate it. Some elements of costs may be higher in the operating plants than those in plants located elsewhere, but it will have a more efficient organization, it will be operating at more nearly its efficient capacity, and its overhead will be better distributed over a larger output.



Airplane view of Plant No. 11

Locating the Plant for Profit

By P. L. BUSH
Chief Engineer

and R. E. SANBORN,
General Superintendent
California Packing Corporation

HAPHAZARD location of a factory is not, perhaps, a primary cause of failure, but it is often an important contributing factor in the collapse of an otherwise sound business. At least seven or eight factors need careful consideration when choosing a site for a cannery. There may be others involving a local situation, but it is hardly possible to predict them in advance.

Obviously a cannery must be located where there is raw material to can. This does not mean necessarily that a corn cannery should be located in the middle of a cornfield or that a cannery for peaches must be surrounded by peach trees. Both of these things have been done, but other considerations generally outweigh the advantage of having material for canning literally at one's back door, and make location at some point easily accessible to, but not in immediate contact with, the growing area more desirable. However, in locating a plant at some distance from the sources of raw materials, the ideal, "from field to can the same day," should not be forgotten.

As a location for a canning factory, Sacramento was an excellent choice from the standpoint of access to raw material. A relief map of the State of California shows to the east the high range of the Sierras, to the west the lower peaks of the Coast Range, broken at San Francisco Bay by the combined valley of the Sacramento and San Joaquin rivers. At the northern boundary of the state these two ranges are joined by the Siskiyous, and within the state's border to the south lie the Tehachapi Mountains. Within these mountain ranges is the great valley, roughly 450 mi. long and about 40 mi. wide. In this aera of some 18,000 sq.mi. and in the smaller valleys among the spurs of the Coast Range and on the Coastal plains to the west of them, are grown the canning crops of California, of which there are about twenty-five.

Sacramento is located directly in the middle of this valley about 100 mi. from San Francisco on the navigable Sacramento River. Ample supplies of fruits and vegetables for canning purposes are produced in almost every direction from this city. Some products are grown almost at the city gates, such as spinach, beets, carrots, and tomatoes, and few of these products need be hauled more than 6 to 10 mi. To the north a distance of 40 or 50 mi. lies Sutter County and its neighbor Yuba, which together have about 20,000 acres of canning peaches, or about one-fourth of the total peach acreage of the entire state. And if this is not enough, there is another 25,000 acres within 150 mi. to the south of Sacramento. The Bartlett pear flourishes along the banks of the Sacramento River, with about 15,000 acres within a radius of 40 or 50 mi. from the city.

These fruits and vegetables, spinach, beets, carrots, peaches, pears and tomatoes, make up the bulk of products that are canned at Plant No. 11. In normal years, they provide for a fairly steady operating season from March to the first of November or a little later. Besides these, however, other fruits and vegetables are available within easy hauling distance of the city. The delta region from which 98 per cent of the canned asparagus pack of the United States is put up is but a few miles down the river. Considerable quantities of apricots are grown within easy hauling radius of the city. Likewise, plums, prunes, and cherries occupy large acreages in the counties surrounding Sacramento.

Besides these primary raw materials, the canning factory requires certain secondary products such as sugar, salt, vinegar, and containers. Cans are made in Sacramento and transported to the cannery in freight cars. Sugar and salt are refined on San Francisco Bay, only a short distance away.

Adequate transportation by both rail and highway is a prime necessity for a cannery. Aside from the transportation of raw materials and finished goods, good highways are desirable to make it as easy as possible for workers to get to and from their jobs. Three transcontinental railroads enter Sacramento, the Southern Pacific, Western Pacific, and Santa Fe. In addition, there is an electric line, the Sacramento Northern, connecting the city with San Francisco Bay cities and with

the growing area to the north. The Southern Pacific and the Sacramento Northern serve the plant. A double spur track on two levels connects with the Southern Pacific, and on the opposite side of the building the electric line operates a spur track into the plant yard.

Besides these forms of transportation, another is available, although this company makes relatively little use of it because of the complete railroad service. The Sacramento River is a navigable stream, and there is considerable traffic up and down the river between Sacramento and San Francisco Bay cities. The combination of steam and electric railroads, a navigable river, and a radiating network of highways, the latter over a very flat country with practically no grades, leaves little to be desired in this particular site for a canning factory as far as transportation is concerned. Hauling fruits from orchards to canneries makes up so large a part of the summer business of the railroads of California that special express fruit trains are run from the growing areas to the canning centers.

Labor Supply Important

Another factor, probably the most important to be considered in selecting a site for a canning factory, is labor supply. Cannery operations require semi-skilled labor, and if there is a supply to draw from, so much the better. Furthermore, canning is seasonal work, and at the end of the season the workers must go elsewhere, give up work during the off season, or else be retained as part of the skeleton or maintenance crews of the cannery.

If the workers can go elsewhere in the same vicinity to work, following the end of the cannery season, they are much more likely to be available when the next season begins. The group that are without work during the off season—housewives and school girls—are more likely to be available in the next season if they are willing to live in the place where the cannery is located. Likewise, the maintenance crew or skeleton crew retained during the winter months will be a much more satisfied group if local living conditions are satisfactory. In any case, from the standpoint of those working in the cannery, a small city or town is much better than a factory isolated or far removed from comfortable living quarters. Dormitories or labor camps have often been established with fairly satisfactory results, but permanent living quarters, independent of the control of cannery management, are without question the choice of the class of workers the cannery prefers to have on its payroll. Sacramento satisfies these requirements to a high degree.

For making steam, for washing raw materials, for making brine and syrups, and for sanitary purposes, a cannery must have plenty of water. Another very important factor in choosing a plant site, therefore, is the water supply. Spinach packing, for example, requires enormous quantities, and no product can be packed without an ample supply of potable water. In fact, potability is not the only requirement, for some "hard" potable waters contain dissolved substances that are distinctly deleterious in a can of fruit or vegetables when it is subjected to the required heat treatment.

Where possible, wells usually are preferred as the source of cannery water supply. At Plant No. 11 there are two wells and also a connection to the city water supply of Sacramento. The well water and the city water are of about the same quality, so that the city supply acts as standby in case of accident to the well equipment.

In some places, the availability of fuel supply may be a problem to be considered in establishing a factory. This, however, has not been the case in California, where oil or gas is burned almost exclusively, and fuel oil may be delivered on short notice by truck or tank car. At Sacramento oil is brought to the plant by tank car from one of the refineries around San Francisco Bay.

Another problem which must be considered in selecting a site for a factory is waste disposal. A large part of the water used around the cannery goes to waste. Then, there are the solid wastes arising from peeling, cutting, coring, and pitting of fruit. These solid wastes have little or no salvage value, but have a very high potential nuisance value. Occasionally some of them can be used for hog feed, though this method of disposal usually is not to be relied upon. Fruit pits have some salvage value as raw material for the manufacture of carbon, acetone, organic acids, and esters. Tomato pomace can be dried and sold for poultry feed, but the returns are somewhat uncertain. If the waste can be disposed of via the sewage route, that probably is as satisfactory a way as any, and in Sacramento this method is followed, with the exception of fruit pits, which are salvaged, dried, and used as mentioned previously.

Unless it is planned to install a generating system or to operate a steam-driven plant, the availability of electric power and the rate structure of the company supplying it should be taken into consideration in selecting a factory site. Steam-engine-driven plants are almost obsolete, although they have some features to recommend them. In California, at least, it does not pay to generate one's own power. At Plant No. 11, the hydroelectric power of the Pacific Gas & Electric Co. is available at favorable rates.

Proximity to Markets Secondary

These factors, then, probably are fundamental in considering a site for the possible location of a canning factory: Availability of and access to raw material, the adequacy of transportation facilities, the quantity and quality of labor supply available, the quantity and quality of water available, cost of fuel and power, and easy waste disposal. Proximity to markets should be considered, but in our particular case, proximity to markets is of strictly secondary importance. Proximity to raw materials far overshadows it.

There also are questions of land values and taxes. In cities, zoning ordinances are likely to restrict canning factories to areas where land values are in line with the purpose to which the land is to be put. It is of doubtful value to erect a plant on the outskirts of the city, outside the city limits, to get cheap land and avoid high taxes. Sooner or later the factory usually finds itself inside the city limits, and although its land values may not be greatly increased thereby, its taxes are almost certain to be.

Modern zoning ordinances in most cities specify the type of factory that may be built in given zones. Where this is true, it usually will take care of industries which might be undesirable neighbors. Smoky, sooty, or malodorous industries, such as gas works, would certainly be undesirable. Plant No. 11 is very unlikely ever to be encroached upon in this respect. Streets are on three sides of the plant and the railroad is on the top of a high levee on the fourth side. At the present time its nearest industrial neighbors are two creameries, a coffee packing plant, and a large nut-packing establishment, none of which is in any degree undesirable.

Simplicity—Not Size—Features Plant Design

By JOHN CERRUTI
Superintendent, Plant No. 11
California Packing Corporation
Sacramento, Calif.

THE best answer to the problem of design of any plant must be built around the idea of simplicity, for the simpler and more direct the operation of manufacture, the easier it will be to operate with efficiency. In visualizing the application of this principle to a many-product plant, one's thought may easily be led astray by size or multiplicity of units. Yet Plant No. 11 is in general only the equivalent of a single-line plant many times multiplied.

The factory itself covers two city blocks near the northern end of the city. Embodying the principle of simple, straight-line production, it is so laid out that raw material enters the plant at one end and progresses through to the other end. At the several necessary points, in the sequence of operations involved in manufacture, the different materials and services are conveniently situated. Thus the first operations are receiving, weighing, and preparation of the raw material for subsequent operations, all of which are carried out at the east end. The next group of operations, broadly speaking, is that of canning, syruping, exhausting, and can-sealing. Close to the point where the cans are first needed are the can-unloading stations, where bulk cars of empty containers are unloaded and conveyed to the can traying-up tables with a minimum length of conveyors. Thus cans are received near the middle of the plant, with the can storage room near by on the second floor. And likewise the boiler room also is situated as close as conveniently possible to the equipment where steam is needed, which also is about midway between the extreme ends of the factory. Further on in the progress of manufacture is the large warehouse, adjacent to which is the carton storage room, the latter containing also the box-nailing equipment for wooden boxes and the press for imprinting the shipping containers with the name of the product which they contain.

A Southern Pacific railroad siding (Fig. 1) is located on the north side of the plant throughout its entire two-block length. The Sacramento Northern electric railroad has a siding which serves the entire south side of the plant (Fig. 2). Thus each department of the factory is adjacent to both of the rail transportation services. For motor-truck service, a loading dock extends across the entire east end, and at the opposite end of the factory an areaway capable of holding several motor trucks extends into the warehouse at the extreme southwest corner. By being indoors, the latter has the advantage of affording shelter from heat of the sun or from inclement weather, both of which are sometimes quite severe during the busy season. Over the receiving dock on the east end, a marquee affords a similar protective shelter.

Sidings Are on Two Levels

It happens that the Southern Pacific line passes the plant on a high embankment, a condition of which we have taken advantage to have two Southern Pacific railroad sidings but situated on different levels (see Fig. 1). Thus rail shipments of part of the can supply, fuel oil, and some raw materials for manufacture are received on the second floor at points very convenient to the respective departments in which they are used.

Some raw materials, particularly peaches and pears, are received on the upper level siding at the end nearest to switch points. Cars of empty cans and other cars in the process of being unloaded or loading at the ware-

Fig. 1—Adequate railroad sidings are of first importance in the design of most plants

house are at the farther end of the lower siding. This feature obviates the necessity for disturbing partially loaded or unloaded cars of cans or cased goods, and avoids possible consequent damage caused by knocking them over through rough handling by the switch crew when they are not yet braced. It must be remembered that on very busy days this plant will handle an entire trainload of raw material, and will require frequent shifting of empties for full cars. Therefore, the excellent arrangement of the siding is at once apparent.

The factory building itself is of brick, tile, and concrete construction. A frame, monitor type roof covered with composition and gravel roofing covers the structure, and is supported on frame trusses, which in turn are upheld by 6x10-in. wooden posts set in the floor below. Most of the plant is of single-story construction except the northeast corner, the cafeteria over the east end, and two sections through the middle, which are of two-story construction. Over the tomato and spinach equipment of the second floor the roof is of concrete girder construction supported on 12-in. square concrete posts. Walls between the two-story part and the rest of the plant are of brick, except a hollow-tile partition between this floor and the sauce room. The floor of the second story, carrying much heavy equipment, is mounted on concrete joists supported by four rows of 16-in. concrete beams on 16-in. pillars. The lye-peeling room is borne on 6-in. steel I-beams, as is also the can loft.

Swinging Sash Give Ventilation

Offices, locker rooms, and the like on the first floor are built of framed tongue-and-groove lumber. Steel window sash with swinging middle portions are used and, where these windows open into offices or cafeteria, semi-cylindrical screens are attached to the outside of the building. Similar screens are used also in departments where fly prevention is essential.

Approximately one-half of the first floor of the plant (see Figs. 4, 5, and 6) is occupied by the preparation, canning, and processing departments, the remainder being taken up by the warehouse. Walls of the warehouse are of brick with steel-curtained doors which release automatically in the event of fire. Hollow-tile walls are used within the main building around the second floor, housing the peach-peeling equipment, can loft, tomato preparation and sauce departments, and cafeteria.

Fig. 2—Plant No. 11 is served by two railroads, an electric line serving this side, while the other side is served on two levels by a steam railway

The greater part of the building is one story in height, in order to get the advantage of this type of construction. Those departments located on the second floor are the can loft and lye-peeling room, and certain parts of the tomato or spinach departments, all of which employ but few workers and consequently require less general supervision than the rest of the plant. Supervision of the work on a single floor is very easy and, furthermore, the single floor simplifies the layout of equipment, particularly of conveyor lines. It also avoids much expensive elevating equipment. A freight elevator is used whenever any raw material arrives by rail on the upper level siding on the north side that must be lowered to a preparation department on the first floor. A

Fig. 3—Sketch layout of the first floor of Plant No. 11

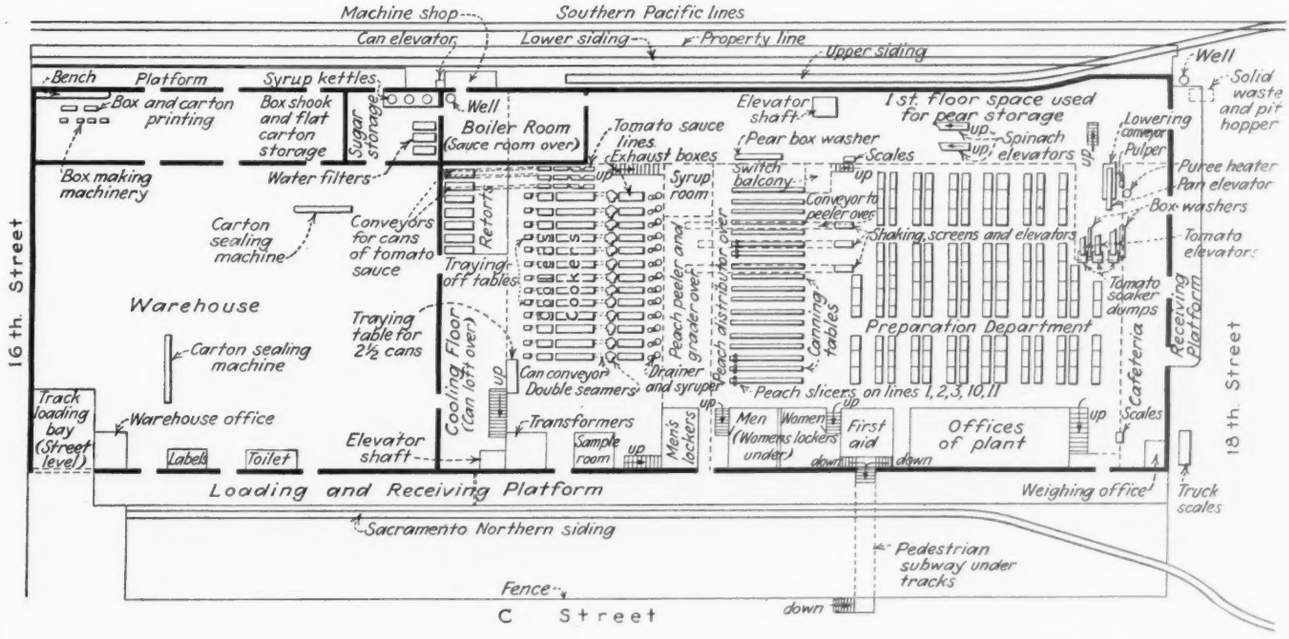


Fig. 4—Design for light, comfortable, and adequate working space, including trucking aisles, is evident in the preparation department

second freight elevator in the middle of the building on the south side leads to the can loft.

A singe-floor factory is basically a big, open room, in which the usual practice is to locate individual, auxiliary departments around the edges, such as offices, locker rooms, and the like, as shown in Fig. 3.

All machinery in this plant is driven by electric power. The transformer room, built of brick and placed along the south wall, is kept locked at all times. The upper part of the transformer room serves as one of the two switch balconies in the plant, the second being located on the other side of the room on a built-up steel balcony (Fig. 7).

Electrical outlets, both 110-volt and 220-volt, are in abundance throughout the plant, which is a very important feature for facilitating the use of extension lamps or for connecting small motors such as portable electric drills and the like. Lighting fixtures and outlets are marked with a circuit number corresponding to one of the near-by switches, making it easy for a person unfamiliar with the plant to find quickly the switch which controls a given circuit and also simplifying repairing or extending the circuits.

Group Drive Used

The unit or group-drive system, rather than the individual drive system is used for operating the machinery, whereby equipment closely connected in actual service is driven by belts from a single motor. For example, each line of processing equipment, comprising drainer, syruper, exhaust box, double seamer, cooker, and cooler, is driven by a single motor through three countershafts and belts to each individual piece of equipment (see Fig. 6). Each machine in a group has an individual clutch drive, so that any machine can be stopped without stopping the remainder of the line. On all process lines push-button switches to control the motor are placed on the roof trusses overhead and operated by pull chains conveniently reached from the double-seamer operator's position.

Canning table delivery belts and the peach slicing machines also are driven as a unit, with one line shaft extending clear across the east end of the canning table and with overhead countershafts to operate the slicers at the west end of the tables (see Fig. 8). Two peach-peeling and grading lines are each driven by a single motor (Fig. 12). Peelers and graders are driven through variable speed drives. Here again each unit of equipment is equipped with a clutch so that it may be stopped without stopping the remainder of the lines. Elimination of much of the motor overcapacity often encountered is made possible by this arrangement, yet with little if any loss of flexibility. Investment in motors is thus much reduced.

Much All-Purpose Equipment

Certain general equipment in the factory is used for packing all products. Under this head may be included canning tables, exhaust boxes, double seamers and cookers or retorts. Such equipment may be called permanent, since it is heavy, and once installed cannot be readily moved out. Retorts are not used for processing the same product as the open-type cookers, of course, but on account of their weight and size, must be accorded a place among the permanent items. Syrup, peeling, and grading equipment also belongs in this category for much the same reason.

Spinach equipment, which is used only a few weeks in the spring, and tomato equipment, used for only a few weeks in the fall, can be used for nothing else and, as it takes up much room, is given a corner of the factory by itself, the second floor at the northeast corner, where it will occasion a minimum of confusion during the season when it is not in use.

Other equipment which might be classed as portable is installed when needed and dismantled and stowed away when not in use. Shelves and belts used on the canning tables during the spinach season are removed and stored away when the pear season begins, to be replaced by the brine tanks used in pear canning. The "merry-go-round" carrying pans of scalded tomatoes through the preparation department also is removed and stored when the tomato season is over.

Six hundred and twenty workers are employed in the preparation department—the largest department in this plant—when the plant is operating at full capacity. The tables used here have been designed to accommodate two women at each table (see Fig. 10) and provide a seat and footrest for the workers. By swinging the seat upward the women may stand at their work if they choose. As shown in Fig. 11, these tables are arranged back to back in double rows, 2 ft. between the tables and 10 ft. between double rows. The narrow 2-ft. aisle allows just room enough for the workers to move to their respective positions, while the 10-ft. aisle between double rows of tables is ample room for truckers delivering fresh fruit, or carrying away the prepared fruit, and also provides space for inspection of work by the forewomen.

Cans Filled Mostly by Hand

After preparation, the food goes into the cans. Practically all California canned fruits and vegetables are filled into cans by hand. With vegetables like asparagus and tomatoes, and with fruit like peaches, apricots or pears, hand-filling is almost a necessity from the very nature of the product, but even if it were not so, it would be very desirable to employ hand-filling, because the filling operation affords the last opportunity for inspection of the accuracy of sorting and grading before the can reaches the market.

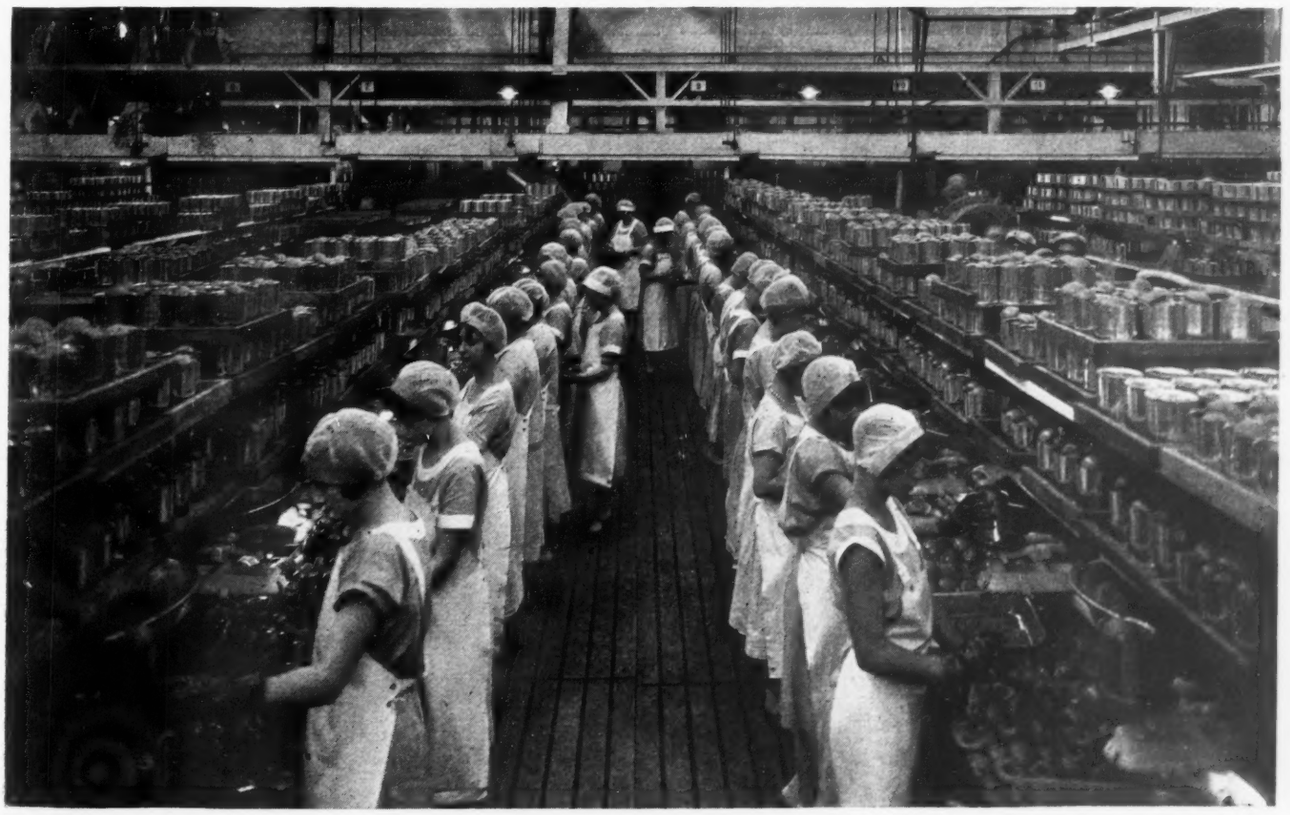
Eighteen canning lines are in this plant, thirteen of which are permanently equipped for peaches and apricots and five for pears (Figs. 9 and 13). Pear tables have no delivery belts, and can be adapted to handle spinach or other products by removing the brine tank and replacing it with a belt or platform.

Canning "Tables" Are Sinks

"Canning tables" are really not tables at all but a row of sinks, built into a steel frame with a shelf or two above and a delivery belt or other feeding device at the back. The material of construction of the sink varies. Blue enameled iron is quite common for sinks and is used at Plant No. 11. Each sink is equipped with a water faucet and a drain (Fig. 13) in a separate compartment at the end of the sink, so that the drain does not become stopped with fruit. A scale and counterweight, and pan or two for waste material, complete the equipment. Waterproof marine electric lights are located just above each sink, to help the canner in inspecting her fruit and make the work easier and more rapid on dark days or at night. The tables are arranged in double aisles (Fig. 5) back to back. In the canners' aisle, which is about 4 ft. wide, the floor is covered with duck boards, for most canners prefer to stand at this work and a wooden floor is more comfortable to stand on than a cement one. In the wide aisles, between pairs of tables, the truckers and checkers move back and forth, bringing trays and empty cans or taking away the filled cans.

A large cafeteria is located on the second floor where factory personnel may purchase excellent meals at low cost if they choose. Its presence enables us to minimize

Fig. 5—Canning tables are so placed that the workers are back to back, with sufficient space for inspectors and forewomen between, and trucking aisles on the other side



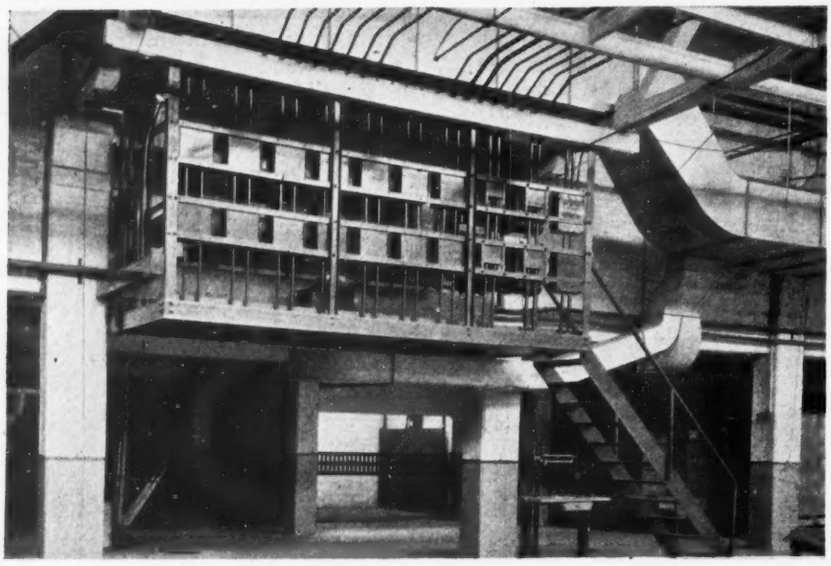
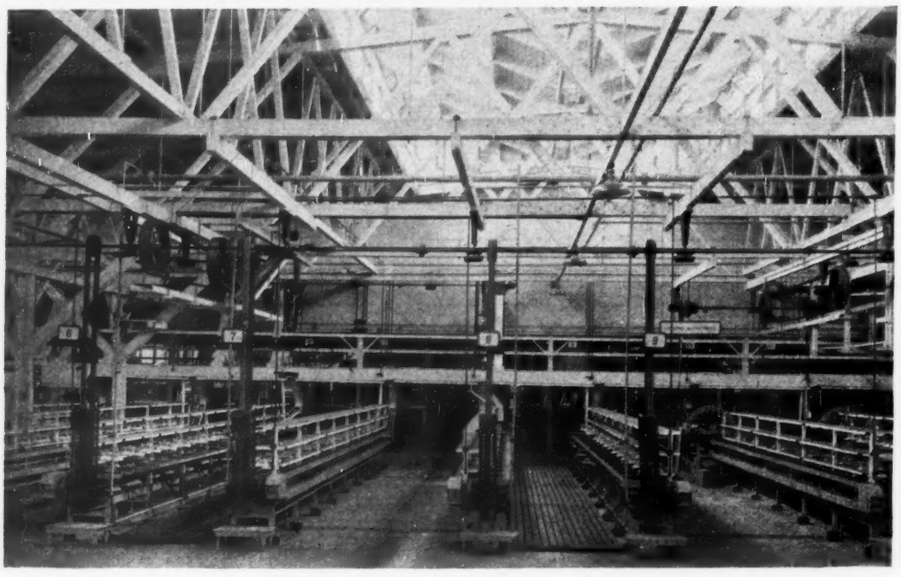


Fig. 6—The method of applying group drive is evident from this view in the processing department

Fig. 7—One switch balcony is above the transformer room while the other, shown here, is supported from the roof trusses

Fig. 8—This view in the canning department shows trucking aisles, working aisles, conveyor belt drive, and drive to slicers



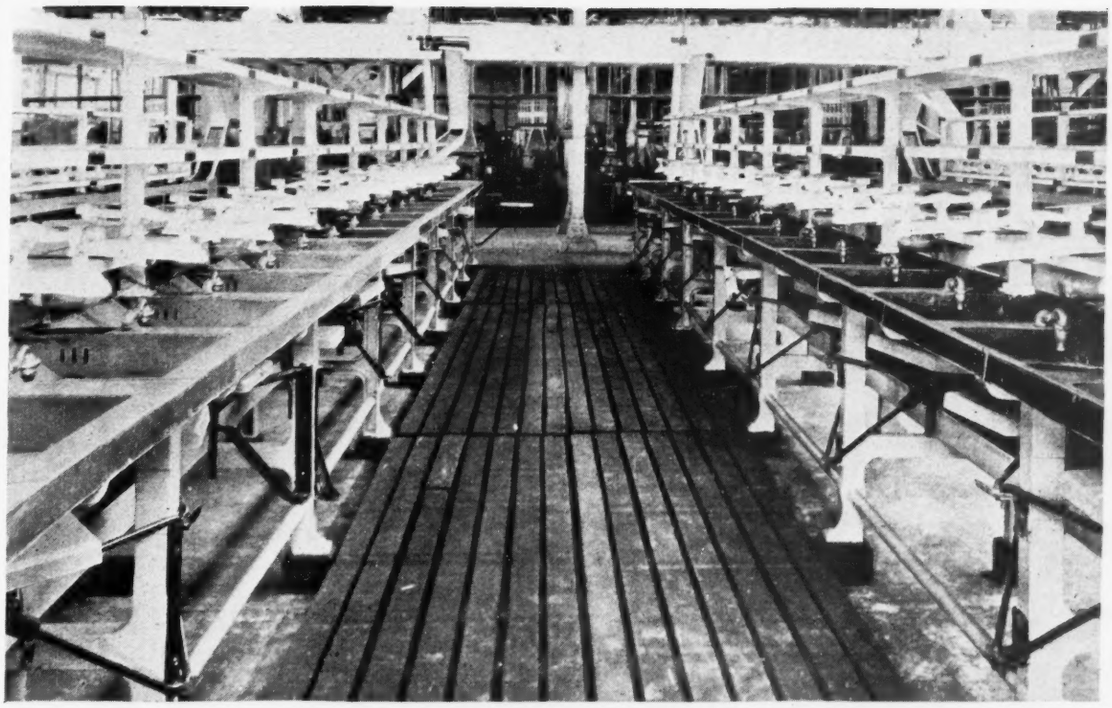


Fig. 9 — Canning tables are permanently placed and are provided with sinks, running water, and seats for the operators

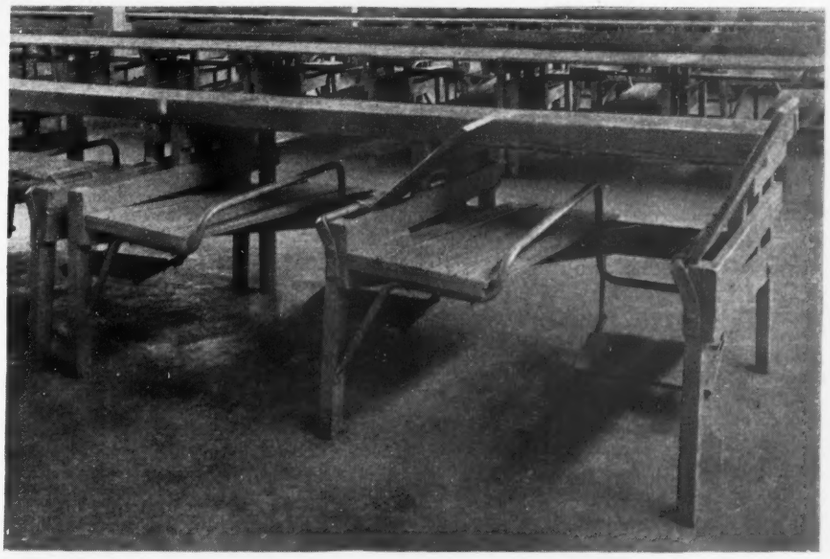


Fig. 10—The preparation tables are in portable units of two

Fig. 11—Arrangement of the preparation room with workers placed back to back, and trucking aisles between each two tables

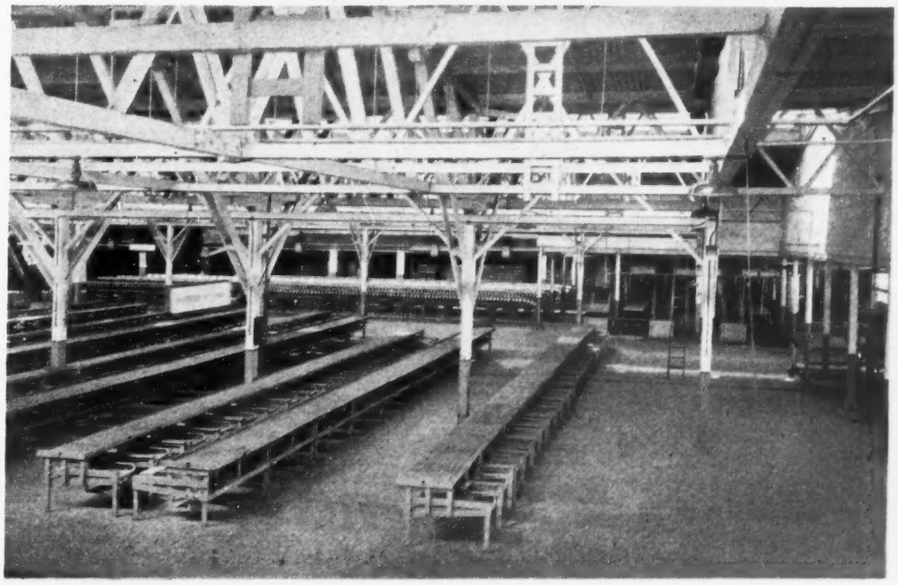


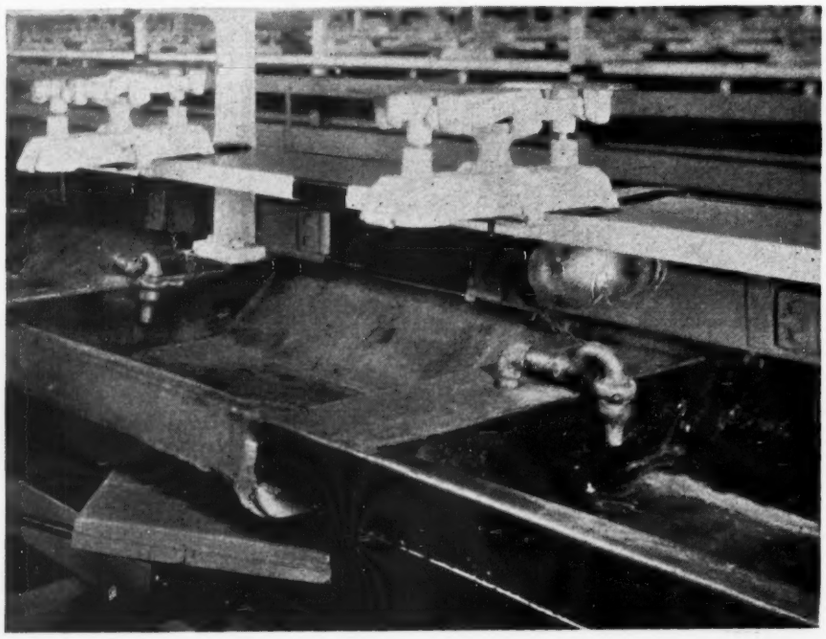
Fig. 12—After passing through the lye-peeler and the washer, peach halves are graded and sorted here

the interruptions of meal times, for, when the packing season is in full swing, minutes are precious.

Near the employees' entrance, the usual first-aid department is found in the middle of the south side of the plant. Because of the fact that to enter the factory employees must cross a railroad, which may be very busy during the rush season, the employees' entrance is through a subway passing underneath the Sacramento Northern tracks. It affords a safety precaution and eliminates delays to the employees while waiting for an unobstructed crossing.

Details of the various operations are omitted in this general description of the plant. In many of the accompanying illustrations, however, they can be seen. Only those features are included that are fundamental to all food manufacturing.

Fig. 13—In this close-up view of a canning table note the covered electric lights and the scales for each canner



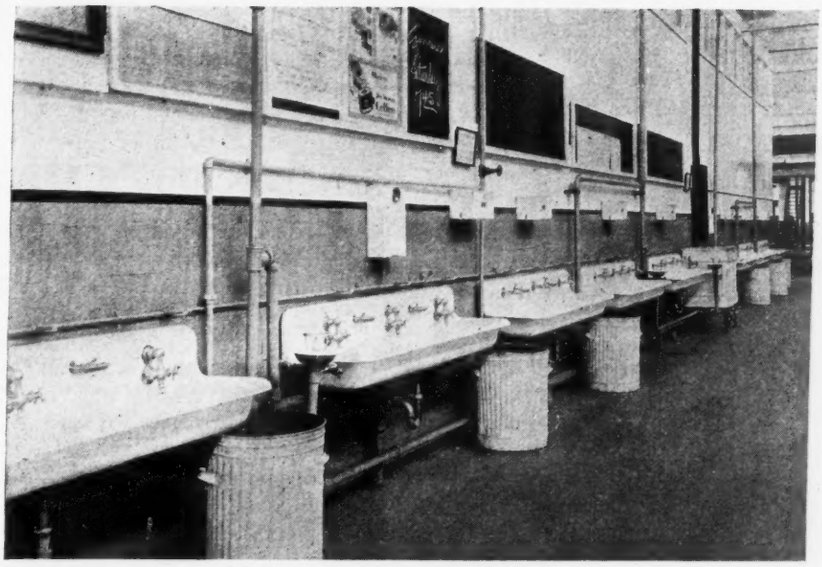


Fig. 1—Washing sinks with soap, water, and towels in preparation and canning rooms

Keeping House In a Big Plant

EDITORIAL STAFF
ARTICLE

CLEANLINESS, to be thoroughly effective, should be built into the plant itself. By this is meant that the construction of the plant should be such that it lends itself readily to cleaning up and keeping clean. Impervious walls and floors that can be scrubbed when necessary; smooth floors evenly pitched to drains and without low spots where water can stand; ample light and white paint, so that unsanitary conditions may be readily seen and not easily neglected; floor drains at frequent intervals, of capacity sufficient to carry away all waste water, and designed to avoid easy clogging; equipment that can be readily and easily cleaned, that is mounted either on legs so the floor under it can be cleaned or else tight against the floor so that débris will not collect underneath, are important features to be considered.

These features have been incorporated in the construction of Plant No. 11 by the California Packing Corp. Outer walls of the factory are of brick, painted gray on the inside to 4 ft. above the floor, and white from there up. The ceilings, roof trusses, and ceiling beams also are painted white. All floors are of smooth-troweled concrete. Monitor roof construction gives daylight even in the middle of this building, which covers two city blocks. This monitor roof with its four rows of windows assures thorough natural ventilation in the warm climate of Sacramento, where all outside doors can be left wide open. In the cook room, ventilating stacks at the entrance and exit of each exhaust box, vented near the ceiling under open windows, keep down condensation in a department that otherwise is often moist and steamy, with water dripping continually if ventilation is inadequate. Also the retort cooking department is frequently a very moist, steamy place, because the retorts must be operated with steam continually escaping from them to provide sufficient circulation within. At Sacramento this has been obviated to a considerable degree by placing a hood entirely around two sides of the retorts in the cooking department (the other two sides being walls) and slanting the sides of the hood so that the steam condenses and runs down into a gutter at the bottom.

Floor drains have been located with regard to the placing of equipment so that they will be adequate both in location and in capacity. Thus, through the preparation room at the east end of the plant, where the only need for floor drains is to carry away the scrubbing water, four drains run the full length of the room from east to west and a fifth takes care of the pear-ripening space adjacent to this room. In the canning department the floor drains are continued from the preparation department and two additional drains from north to south have been added; one at each end of the line of canning tables. Waste water from each canning table is thus able to discharge either directly into a drain or indirectly through a short length of drain pipe. In the cook room are placed four drains running from north to south; two under the cookers, one in the front and one at the rear, one under or to one side of the row of double seamers, and the fourth under the line of syruping machines. In this same department there is still another line which runs in front of the retorts. In this manner an effort has been made to place drains so that the waste water will flow into them either directly or through very short lengths of extra drain pipe.

The drains are all open, with iron gratings extending along their full length, as shown in Fig. 2. They can be opened for cleaning throughout their entire length. The short lengths of pipe running from canning tables and other equipment into these drains tend to prevent clogged drain pipes and make them easy to clean should clogging occur. All these drains empty into a sump on the south loading platform outside the building, where solid material that might stop up sewers is strained out. The large quantity of water required in cannery operation makes these drains almost self-flushing, but to make doubly sure, an additional quantity of water is run through them at the end of each day. Once a week they are opened, examined and cleaned out.

In the peach-peeling room on the second floor, the peelers, washers, and graders are surrounded by a curb (Fig. 3) and the floor within the curb is sharply pitched to the drain. Curbs also surround the stair wells and the tomato and spinach equipment on the second floor at the northeast corner of the building.

As far as possible, equipment has been adopted that is not injured by the application of water or steam. Where this equipment is located overhead, as the peach distribu-

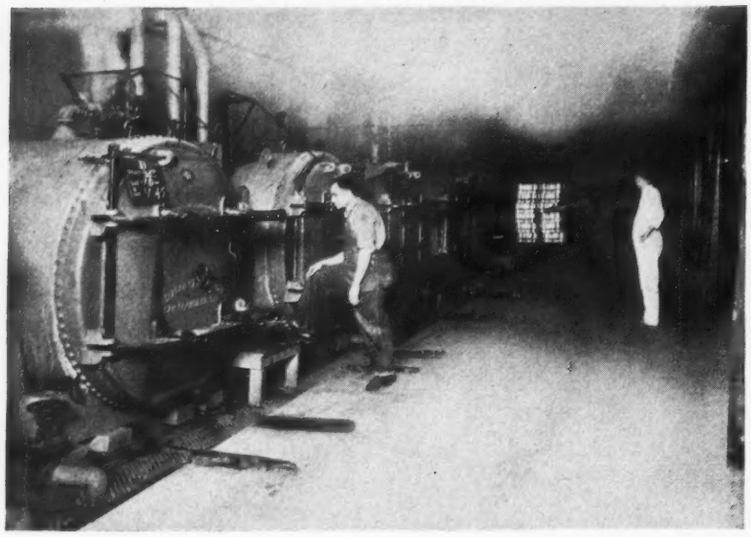


Fig. 4—Curtain around retort space retards flow of steam to other areas

tor system, for example, metal drain pans have been mounted underneath so that a hose may be turned onto the equipment, thoroughly flushing and scrubbing it without causing water to drip over everything below. A dry floor is a great help not only in keeping things clean but in improving the appearance of a plant. To help keep the floors dry, drain pans have been installed under equipment where there is likely to be a drip on the floor. For instance, in front of each cooker where steam pipes enter and also under the driving gears, from which grease is likely to drip, drip pans have been placed.

Double seamers or can-closing machines are provided with sheet metal pans pitched to and emptying into drains. A large metal drain pan mounted on casters has been placed under the conveyor on which pans of scalded tomatoes are lowered from the second floor to the preparation room. Since a great deal of the equipment in this factory is driven by belts, there are many overhead bearings, each of which is equipped with a drain pan to prevent grease from dripping onto the floor or onto other equipment that may be placed under them.

Boxes that have held fruit provide excellent surfaces for growth of mold; hence special care must be taken to keep the boxes free from accumulations of crushed fruits and moisture. At Sacramento, before the field boxes are returned, they are passed upside down through a box washer and thoroughly sprayed and flushed out with steam and hot water. Small boxes used for handling cut pears are conveyed through a bath of boiling water and rinsed in cool water before going back to the preparation tables, to insure that they will be kept thoroughly clean.

Water and steam pipes have been run to convenient outlets all over the preparation and cooking rooms. By means of suction tees it is possible to get hot or cold water, or steam at almost any point in these departments. For example, in the cook room, eight steam, water and hose outlets have been located on posts at suitable intervals near the entrances to the exhaust boxes of the thirteen canning lines. Similar outlets have been placed also at each of the thirteen double seamers; in the tomato-sauce lines there are three, one for each line of equipment. These make a total of 24 steam or water outlets in this department alone. Other departments have been proportionately well supplied.

Syrup lines are arranged with steam and hot-water connections, so that after they are drained at night they may be thoroughly flushed out with hot water and steam, and left filled with hot water until the next morning.

Tomato sauce is cooked in cypress tanks with closed steam coils. At the end of each day's operation these tanks are filled with boiling water after first scrubbing the coils and removing any cooked-on material that may be present. Boiling water is allowed to stand in the tanks overnight and is boiled up again in the morning before the first batch is cooked.

Cleaning-up methods used around the factory differ slightly with different products but in general they are much the same. Two principles are involved: the first, to keep material off the floor during the operating day and, second, to clean everything thoroughly at the end of each day. In the preparation department, cutters or preparers of fruit or vegetables are asked to do very little in the way of cleaning. The tables at which they work would hardly permit this and it is better to keep them steadily on production work, and to leave the cleaning to others. One man is assigned to a double row of tables

Fig. 2—Gratings of floor drain are removable for inspection or cleaning

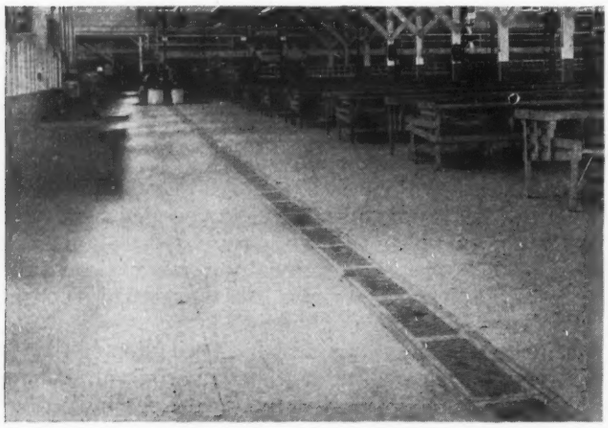
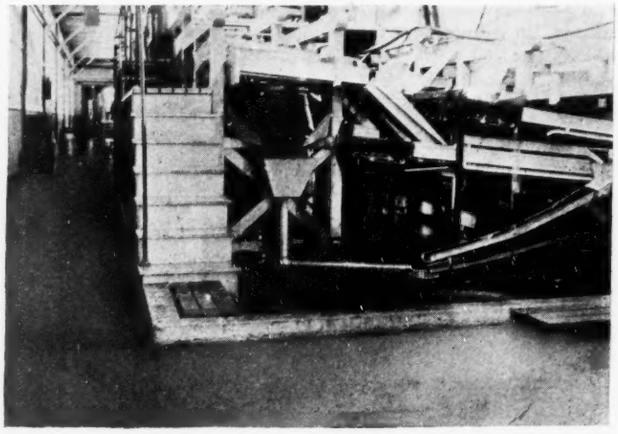


Fig. 3—Floor inside curb around peeling and grading equipment pitches steeply to drain



with instructions to keep things tidy around them and to sweep up any fruit or débris, stems, leaves, and the like that may drop to the floor. With fruits like peaches, that are rather dry, it is fairly easy to keep things tidy; on the other hand, with pears and tomatoes, fruits that are very juicy, some sloppiness on floors and tables is difficult to avoid.

Likewise, in the canning department, the canners have very little to do with keeping their department clean. These workers stand on "duckboards" which not only help to keep their feet dry but prevent a sloppy mess from forming underfoot. In this department, also, there are sweepers and moppers who do nothing but keep this part of the plant in shipshape condition during the operating day. Double-seamer operators are required to look after their own machines and keep them clean.

At the end of the day, however, the real clean-up work begins. In the preparation room the tables are swept off. The refuse, peels, cores, pits, and bits of fruit that may have collected on them during the day are brushed into heaps and swept into a low, metal-lined box mounted on casters, forming a sort of truck. This truck is just a trifle lower than the top of the preparation tables so that it may be pushed under them or alongside of them and the material on the tables brushed directly in.

Most of the solid débris, having been disposed of in this fashion, a 2-in. hose is turned on and everything—tables, floors, and all—are thoroughly flushed and then steamed. This happens daily with all products.

After everything has been flushed down thoroughly, a squeegee is used to get water off the tables and the floors. In the dry climate of Sacramento everything dries very quickly. Tables are then set up with clean boxes ready for the next morning's work.

Cleaning Belt Conveyors

Much the same scheme is followed in other departments. In the canning department each canner leaves her own sink washed out, after which the clean-up crew hoses down the floor, turns the belts conveyors out of their troughs, as shown in Fig. 6, flushes, and scrubs them thoroughly, finally giving everything a thorough steaming. Slotted pulleys, shown in the illustration, are used, and the guard around them is so built that it may be opened up and the inside of the pulley and belt thoroughly washed.

Guards on the peach slicers are removed and the hose is turned on every part of them. Throughout the plant wherever sheet-metal guards have been placed, they are arranged to hook over the edge of the equipment which they guard, so that a simple lifting removes them to clean whatever equipment they shield. In the peach-peeling room, for instance, sheet-metal guards, reaching from conveyor to floor, are used along the edge of the sorting conveyor. At the end of the day they are simply lifted off so that the conveyor and the floor under it may be thoroughly cleaned.

Fig. 7—Pans on stools at end of 40-ft. canning tables catch overflow

Double-seamer operators turn the hot-water hose onto their machines, flush off any accumulations of fruit particles or syrup, and follow this with a thorough steaming, leaving the metal hot and dry. The peach distributor system, made up of long rubber belts, is hosed down with hot water. The lye peeler is drained of its accumulation of lye and flushed out with hot water, as is all the equipment in this department. This includes sorting belts, blanching tanks, and size graders.

All these cleaning operations are greatly facilitated, of course, by an ample supply of water. With two 8-in. wells and a water supply maintained at 35-lb. pressure, there is plenty of water for use in the cleaning operations. Where equipment cannot be steamed, compounds of the

Fig. 5—Drain pan on casters to catch spillage under tomato lowering conveyor

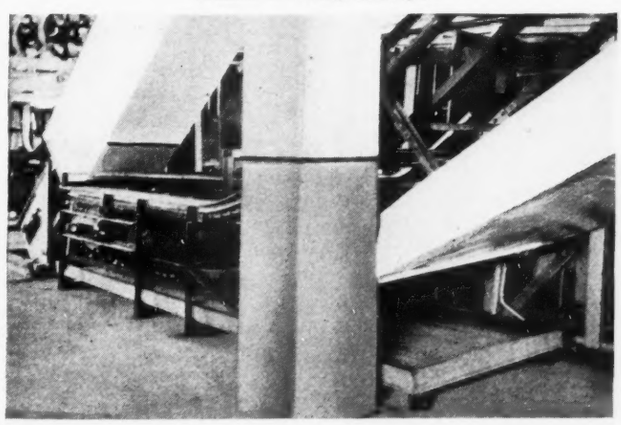
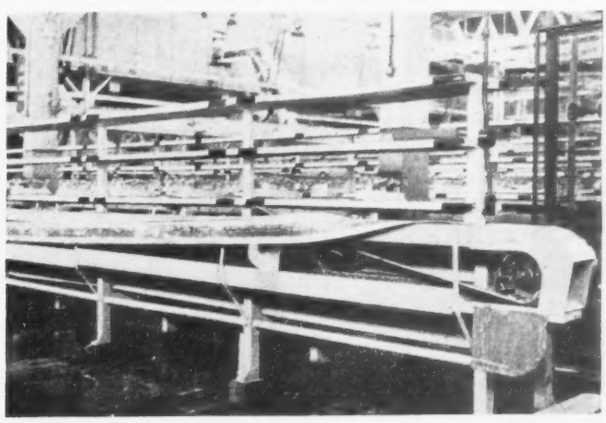


Fig. 6—Rubber belt turned out of trough for cleaning. Slotted pulley face aids cleaning



sodium hypochlorite and trisodium phosphate type are used.

No special crew is utilized for the nightly cleaning of the plant but a certain proportion of the men working around the plant through the day are used. Different subforemen and a different crew do the work evenings, and their performance is subject to inspection and approval by foremen and superintendents. Daily clean-up operations are divided up among the different subforemen so that each man has a definite part of the plant for which he is responsible.

Certain maintenance jobs have nothing to do directly with the sanitation, as far as the pack of canned goods is concerned, but have considerable to do with the appearance of the plant and in this way encourage those at work to keep the plant clean. These activities are carried on during the winter season, when the permanent crew does such work as paint walls and ceilings; dismantles equipment, scrapes, cleans, paints, and prepares it for the next season's work.

Clean windows not only go far toward giving a plant a clean appearance but, by increasing the amount of light admitted, also perform a positive service in helping other sanitation problems. A window-cleaning crew is on duty at all times, and the windows are kept washed and polished throughout the year.

Locker rooms for both men and women are maintained, where they may change from street clothing to factory uniforms. Washrooms and toilet facilities are maintained separate from locker rooms, and in addition to these there is a series of washing sinks in the preparation room itself, located but a few steps away from the preparation tables and the canning tables to provide every encouragement for their use. The one-story construction of the building makes it possible to locate these wash, locker, and toilet rooms very close to the working positions, making them easy and convenient of access without sacrificing any of the advantages that may be gained by having these facilities part of the building.

Uniforms for employees in canning factories are quite desirable, as the quality of work is likely to be much improved if the workers are properly clothed for the work to be done. Since employees are required to buy their uniforms, the uniform is as simple and practical as possible, not only for factory use but for use at home. For women workers the uniform consists of a blue smock, white rubber apron, net cap with a blue bandeau, and rubber gloves. Subforewomen wear a white bandeau on their caps and forewomen are clad entirely in white. These uniforms are purchased by the company and sold to employees at cost. They have proved quite satisfactory. As a matter of fact, there usually is a considerable demand for them at the close of the season by women who wish to use them at home.

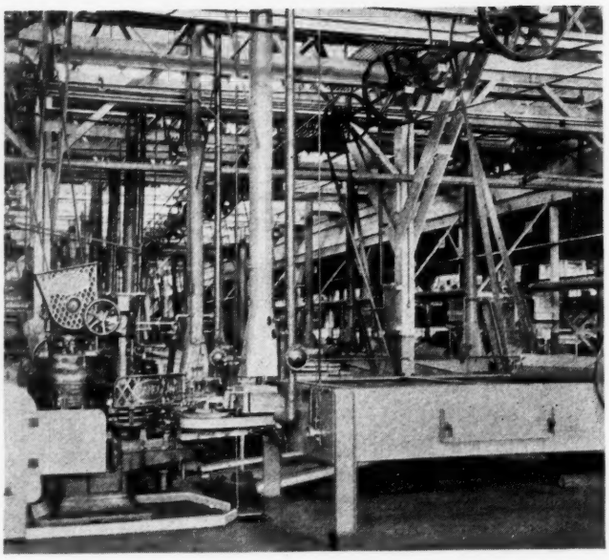
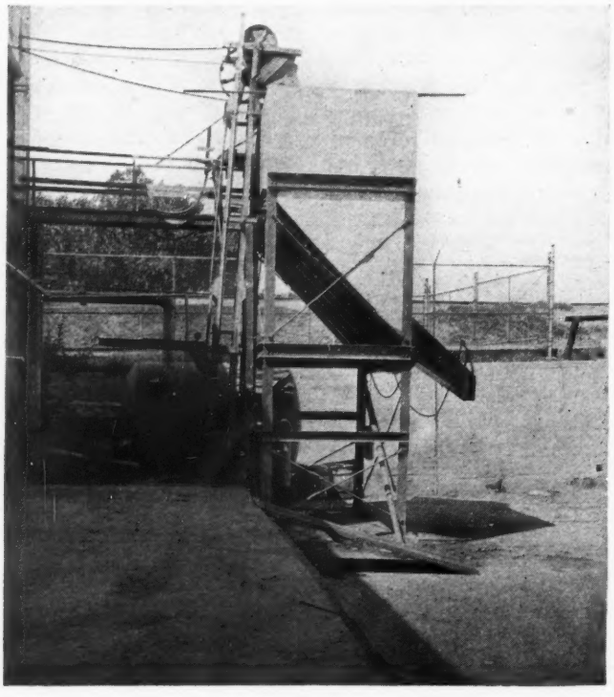


Fig. 8—Drip pans under double seamers and short pipe lengths from exhaust boxes empty directly into drain. Stacks over exhaust-box openings convey steam to roof windows

Uniforms for men consist of blue overalls and shirts, and a black cap. The foremen wear blue and white striped overalls and white shirts, and the superintendent and his assistant wear white altogether. Because all this is work clothing which practically all workers can use either at home or elsewhere, there is no objection on their part to the purchase of it at the low cost available.

To promote tidy housekeeping, brooms, mops, and dust-pans have been liberally distributed throughout the plant and at no point is a worker very far away from one of these cleaning implements. The rubber squeegee is liberally used, particularly during scrubbing-up periods, so that drying of floors is speeded up.

Fig. 9—Concrete hopper for solid waste and pits



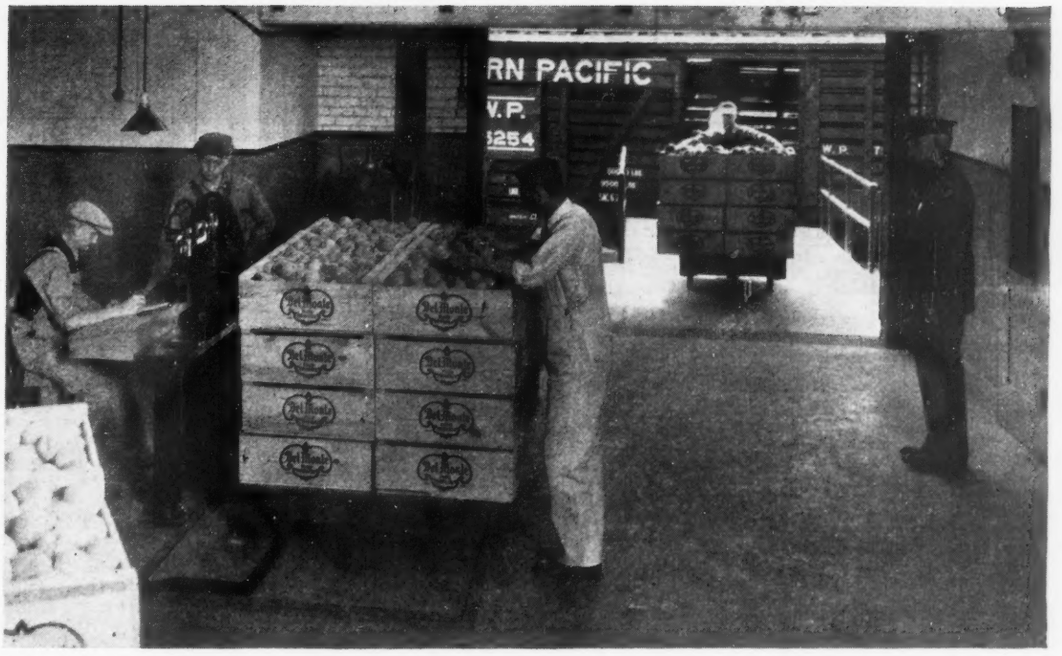


Fig. 1—Weighing-in peaches from a carload

Handling a Daily Trainload Of Raw Materials

A Problem of Management and Equipment

EDITORIAL STAFF ARTICLE

CERTAINLY it would be most unwise to purchase perishable raw material on a quality basis and then to allow it to spoil through inability of the plant to utilize it as rapidly as it arrives. Such a condition necessarily imposes a heavy responsibility on the plant management of synchronizing its arrival with production demands. But, in the canning business, the raw material is a perishable crop which must be handled at once, if it is to be handled at all. Only by high-speed production methods can a plant keep up with the flow of material, and only by the most efficient handling can vast quantities of material be put through on schedule, and at a low cost.

It is not possible for fruit canners to stretch out the ripening period of fruits, as it is possible to do in the case of packers of peas and corn, where successive daily plantings in the spring usually will produce a corresponding succession of harvest days when the crop matures. A given variety of peaches ripens at pretty much the same time in any one locality, and whatever spread occurs in its maturing will arise either from location of the orchard or from the variety grown.

But if the canner intends to pack the fruit, he must be ready to handle it with dispatch. Plant No. 11 of the California Packing Corp. will handle about 2,000 boxes of fruit at one time, which means that three carloads of raw material is in process when the plant is operating at capacity. Working days, which usually are longer than eight hours, will require a fair-sized trainload of raw material every 24 hours to keep the place going.

But because the raw material is perishable, it cannot be permitted to stand very long in cars or on the receiving platform if high-quality finished goods are to be produced. A few hours' leeway sometimes is necessary in plant operations, but delays are to be avoided wherever possible.

Production equipment usually has some optimum speed or capacity at which it is most efficient. If uniform raw materials were a possibility, it would easily be possible to attain the optimum operating conditions, but the variable nature of agricultural products themselves renders it almost impossible to operate constantly at the most efficient speed or capacity. The efforts made to keep everything moving at the best rate involves shifting workers from one size or style of pack to another or, when more than one fruit is being packed, from one fruit to another. "Balancing the house" it is called.

The first difficulty encountered in devising systematic ways and means of handling raw materials is found in the materials. Individual units may be firm and quite symmetrical, such as peaches and apricots; or they may be shapeless, like spinach; they may be peculiar in shape, like pears; or they may be symmetrical but easily crushed, like tomatoes. Bruising or crushing must be avoided in handling the material, or it becomes worthless, hence many hand operations are involved in the canning processes. Until fruit is actually in the can, it must be handled frequently, piece by piece, a requirement which also is true of most of the vegetables canned

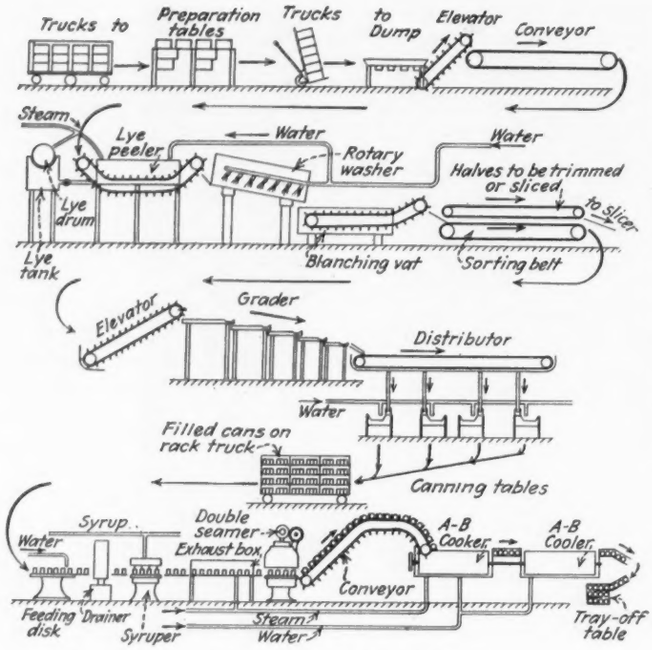


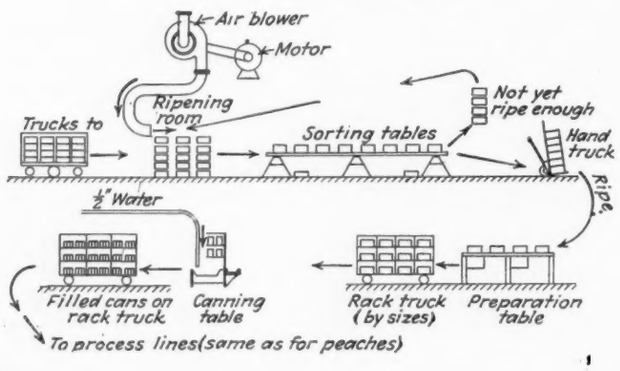
Fig. 2—Flow diagram for peaches

in California. Usually some waste portion, such as pits, peels, or seeds, must be removed. Some products, like pears, are sorted into sizes by hand. The worker who does the peeling usually sorts the halves while she is peeling them. Inspections for quality are frequent, where only the best is to go into the can. And, finally, the operation of canning—i.e., filling the cans—itself requires hand work.

Nevertheless, despite all this necessary hand work, operations are mechanized to a high degree along straight-line methods. Pears travel straight through the plant from east to west until they are in cans in the warehouse, ready for labeling and shipping. Peaches follow a similar path, except that they are diverted to the second floor for peeling, after which they are distributed by size and grade back to the tables on the first floor, from which they resume their westward progress. Tomatoes and spinach make an upward and sidewise movement, but without much diversion from a straight-line path (Figs. 2, 3, 4, 5 and 6).

In general, there are four phases of the material-handling problem in this plant, or in any canning plant. First is the matter of handling the perishable raw materials; second, the handling of prepared raw materials; third, the handling of accessory raw materials, such as containers, syrups, brine, vinegar, and spices; fourth, warehouse handling methods. The fourth is discussed in a separate article.

Fig. 3—Flow diagram for pears



All fruit and vegetables are delivered at the factory at the east end, arriving by railroad, electric line, or motor truck, in field boxes or standard lug boxes. Bulk handling of such products as tomatoes, peaches, or pears, for obvious reasons is hardly a possibility. If arrival is by truck, the load is first weighed at the plant, and then moved to a position along the receiving platform to discharge its load. The boxes, which weigh about 40 lb. each (70 lb. for spinach crates), are stacked five high on a "floor board"—two thin 6-in. pieces of box shook about 24 in. long, held together by three 1-in. cleats—placed cleats down. The trucker, using a two-wheeled cannery truck, picks up the load and deposits it inside the building only a few feet away. During the unloading operation sample boxes are examined, as seen in Fig. 1.

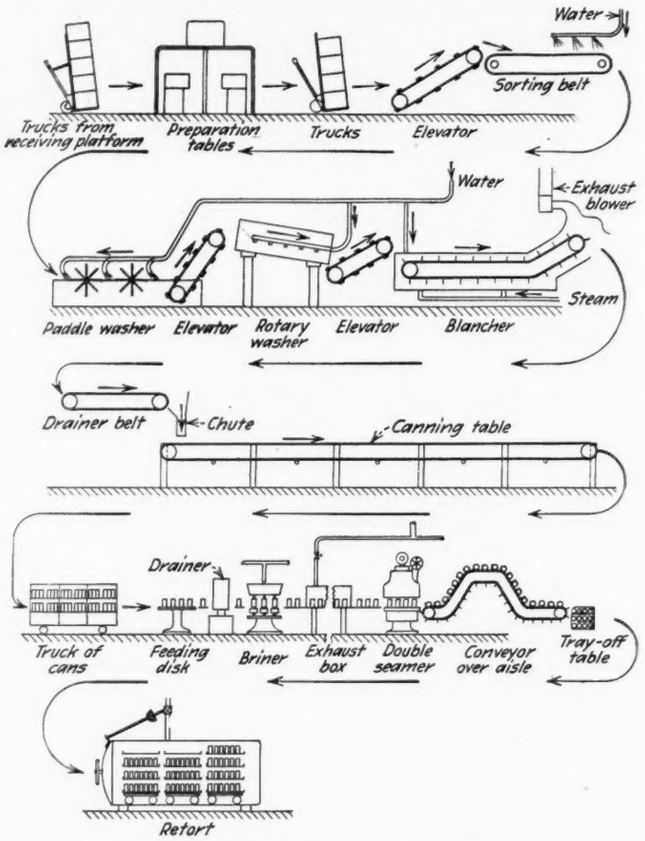


Fig. 4—Flow diagram for spinach

From temporary storage after receiving, the raw material starts through the preparation rooms. Spinach crates, boxes of peaches, or of plums are moved directly to the preparation tables on flat-bed, four-wheeled trucks, loaded with 32 lug boxes. The load always is the same to simplify the work of the tallyman who supervises the material going into the preparation department. Pears go first to the ripening room on the same kind of vehicle. Tomatoes are trucked to the soaking tanks, where the boxes are dumped. Empty field boxes are sent to a box washer and returned to the receiving platform to be sent back to the ranches or orchards.

Hand trucks are used for all of these operations. Any mechanical handling system which might be devised would require almost the same number of men for its operations, and for handling the boxes of fruit, as would hand trucking. Because most of the boxes must be tem-

porarily stored for a short period, anyway, mechanical handling would save no time. One man with a two-wheeled clamp truck can handle five field boxes and place them anywhere they may be required.

With the exception of tomatoes, which move almost entirely by mechanical equipment, hand trucking is used to move products in process from preparation tables. Boxes of trimmed spinach are transported by two-wheeled cannery trucks to the elevating conveyors leading to the washing equipment on the second floor. The same type of truck picks up the lug boxes of pitted peach halves and stacks them near the elevating conveyor leading to the lye peeler. Plums, peaches, and carrots also are transported in this simple equipment.

Pears, however, require a little different handling. The halves are sorted into sizes and grades by the cutters and placed in one of the five or six small wooden boxes. These are picked up by a workman and placed on the shelf of a caster-mounted rack holding 30 or 40 boxes. Only one size or grade is picked up by any given rack truck. At the same time the workman replaces the box removed with an empty one. He makes regular rounds, delivering his rack of boxes to the canning table working on that particular grade or size, empties the box into the brine tanks, and replaces the empties on his rack. He next pushes the rack around to the box-washing machine, where boxes are removed, washed in boiling water, and rinsed in fresh cool water. The rack is loaded with clean boxes and a new round is begun.

Besides the truckers leaving boxes of fresh fruit and those taking away the prepared fruit, there are others who pick up empty lug boxes, remove waste pits, peels and trimmings. To an inexperienced onlooker, the preparation department apparently is all confusion. Actually, however, it is not, for all workmen have definite tasks and follow a well-defined routine.

Between the preparation department and the canning tables the material handling system differs for each product. Spinach is carried by a conveyor belt up an incline to the sorting belt, which delivers it to the paddle washer. It floats through this washer, is picked up by a flight conveyor, elevated a short distance into the rotary-cylinder washer, down which it moves by gravity into the blancher.

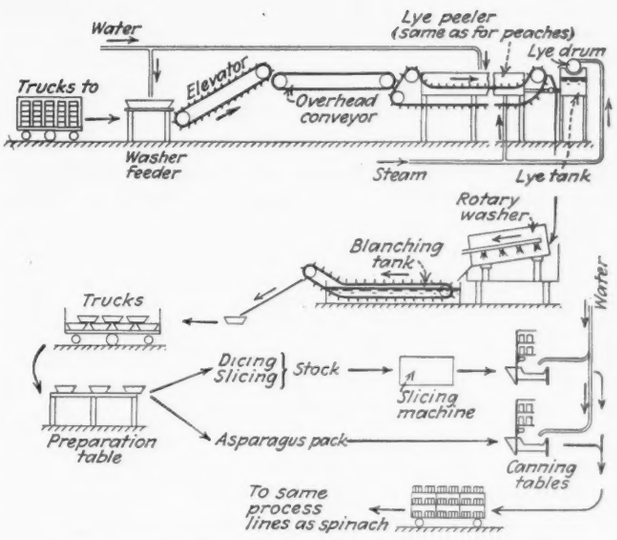


Fig. 5—Flow diagram for carrots

Submersion in hot water for a definite time is required in the blanch, to accomplish which the spinach is submerged and dragged along under the hot water by iron forks on crossbars attached to driving chains along the sides of the blancher. From the blancher (shown in Fig. 12) the hot spinach drops onto a short length of metal mesh belt for draining before dropping down a chute to a rubber belt along the back of the canning tables. The hot, wilted spinach is pushed off the belt with wooden rakes and into the sink of the canning

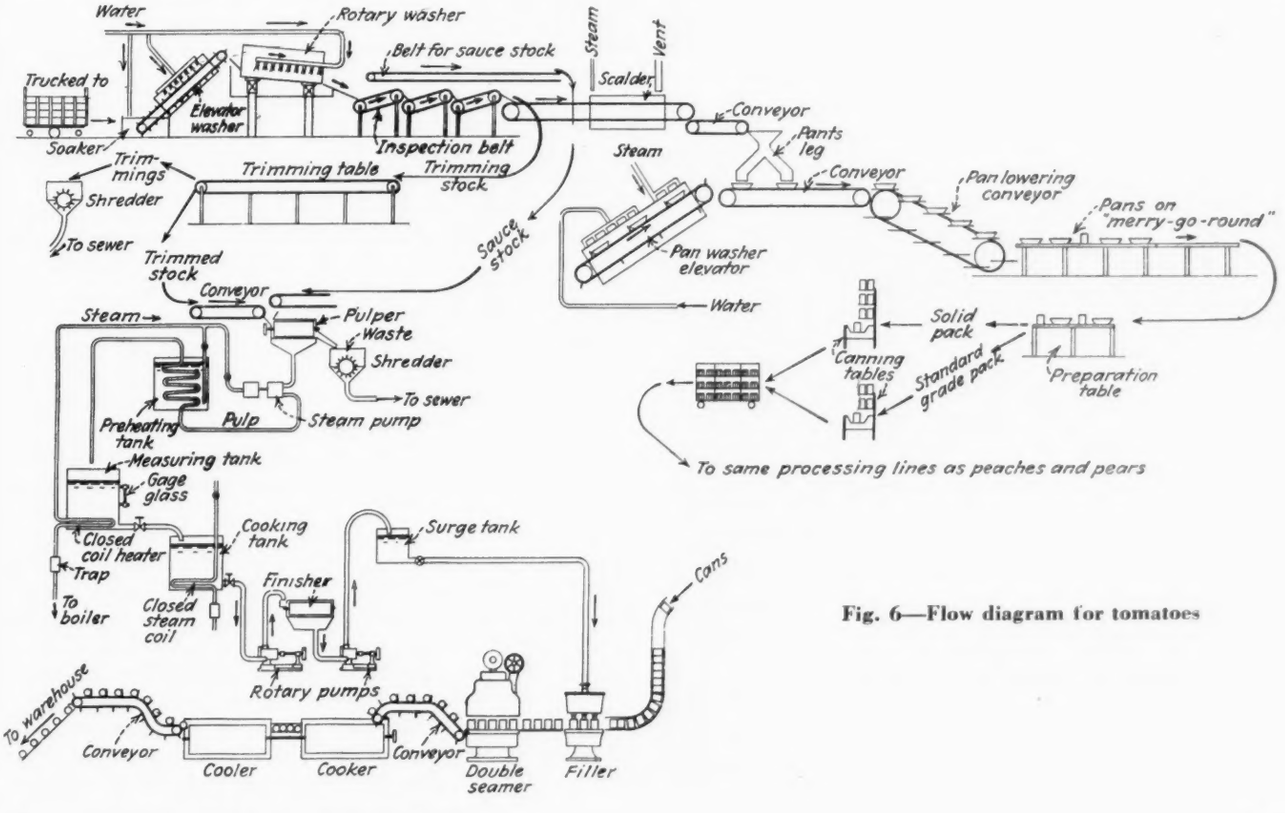


Fig. 6—Flow diagram for tomatoes

tables as needed. In the case of spinach, practically all of the handling has been made mechanical and more or less automatic after the boxes are once dumped.

Tomatoes also are handled almost entirely by conveyors. Boxes are dumped by hand into a soaking vat, from which they float onto the flights of a conveyor elevator leading to a rotary washer much like the spinach washer. Next they pass over three sections of metal mesh sorting belts. Sauce and trimming stock that are sorted out move by rubber belt conveyor to the pulper or to trimming tables, while peeling stock passes through a steam scalder on a metal apron conveyor. Scalded tomatoes drop from the scalder into pans through a bifurcated chute. This device allows two pans to be filled simultaneously. Pans which have been sent up from the floor below on a flight conveyor, have been washed and scalded on the way up, and are conveyed directly to this point, so that workmen have only to reach for them.

Pans of hot scalded tomatoes are pushed directly onto a short length of horizontal apron conveyor, carried about six feet on it to a point where an attendant pushes them, two at a time, onto the flight of a lowering conveyor, a tray elevator wide enough to accommodate two pans to a tray and used only for lowering pans of tomatoes to the preparation department on the first floor. From the lowering conveyor the pans slide onto an endless cable conveyor, called for this reason a "merry-go-round" (see Fig. 14), which will carry either pans or 12-qt. pails, and extends the full length of the preparation department. As the pans move through the department they are removed by men and placed on the preparation tables, which are situated at right angles to the merry-go-round. After the tomatoes have been peeled and cored, the pans containing peels, cores, and trimmings are again placed on the conveyor. The 12-qt. pails of peeled tomatoes also are placed on it to be removed in the canning department at the end of the line. Pans of peels and cores travel around to be removed near the head end of the conveyor, and emptied into the pulper. Empty pans are sent up the elevator

Fig. 7—Preparing pears for canning, showing arrangement of pans and boxes

Fig. 8—A corner of one of the rack trucks used to carry pears from preparation to canning tables

washer to be refilled. Pans or pails that are missed travel around the system until picked up.

After peaches have been halved and pitted they are picked up by truckers with two-wheeled cannery trucks and taken to the elevating conveyors, where they are emptied onto an oscillating, perforated copper plate with openings about an inch in diameter (Fig. 15). Pits, peelings, and trimmings are separated here by the sifting action of the machine and the fruit is spread evenly onto a metal flight conveyor, the end of which is seen in Fig. 15, which dumps it onto a horizontal rubber belt conveyor near the ceiling and leading to the lye peeler. The dumping crew consists of three men, one to bring stacks of filled boxes, one to dump them, and one to stack the empties on a four-wheeled truck to be carried away.

A steel apron conveyor carries the halves through the boiling lye in the peeler and discharges them into the inclined rotating reel shown in Fig. 16, through which the peaches slide by gravity under a water spray where the lye is washed off. The halves are next conveyed through a tank of warm water on a horizontal apron conveyor, and then over a steel-apron sorting belt onto an elevator leading to the size grader, shown in Fig. 16.

From the grader, the peach halves drop by chutes onto the peach distributing system above the canning tables (see Fig 17). The grader divides the halves into six different sizes and drops each size onto one of the eight white rubber belts that compose the distributing system. Hopper chutes lead from the distributor down to each canning table. By placing a gate across the belt, the halves are caused to divert into the chute and thence onto the conveyor belt at the back of the canning tables. When a canner wishes more fruit, she swings a hinged gate across the belt at her table until her sink is full of halves. Peach halves for slicing are kept separate and sent to canning lines, 1, 2, 3, 10, or 11, where they are passed through slicing machines before being delivered to the conveyor belt on the canning table.

Prepared fruits and vegetables on the canning tables now meet their containers, which are manufactured in a Sacramento can factory and arrive at the plant in freight cars in bulk or in paper packages. All sizes of

Fig. 9—Dumping boxes of cut spinach into elevators that carry it to washers on second floor

cans may be received in bulk cars at times. Certain sizes which are little used, such as the 7 oz., particularly during the peach canning season, No. 1 tall, and No. 10, as a rule come in paper packages. Mechanical can-handling equipment is built to take care of only No. 2½ cans—the most commonly used size. Other sizes are handled direct from the car to the trays, or when received in paper-wrapped packages or crates may be unloaded and stored either in the can loft or in some other convenient space. When cars of No. 2½ cans are received on the siding at the south side of the building, a can-way is taken into the car to receive the cans, which are picked up fourteen at a time with a can fork. An 8-in. pipe is set in the concrete loading platform, and through it the can-way runs to a belt elevator inside the building. The belt-operated can elevator, which lifts the cans to the can lofts above, can be started or stopped by push-button control switch on either the first or second floor. From the can elevator the cans pass to one of two cable-driven can conveyors running the full length of the bins from the north to the south side of the building.

A similar elevator (Fig. 18) has been installed on the north side of the factory, outside the building, which delivers cans to either of the two can-ways near the ceiling of the can loft, while the south elevator delivers to only one of them. The capacity of the system is about 200 No. 2½ cans per minute. They are carried along the overhead can-way on cables driven through the end sheave, by a motor and bevel gear drive.

In the east wall of the can loft, and overlooking the cook room, are three outlets for delivering cans to the traying-up table at the west end of the cook room below. One double outlet takes cans from either the east or west can-way. The other outlet takes cans from the east can-way only. It is thus possible to take cans from sidings on either side of the factory, or from either of the two bins in the can loft.

In the bins, No. 2½ cans are stacked 44 high and 44 wide, open ends out for eight rows and then two rows with closed ends out. Since the bins are nearly 200 ft. long and there are two of them, this means that there is space for nearly 2,000,000 No. 2½ cans. In addition to these two bins, there is a third for storage of odd sizes.

To transport cans from the bin storage, the machine shown in Fig. 19 is used. This machine, operated by a 1-hp. motor, runs on channel-iron tracks 2 in. wide, and can be used in either bin. As shown in the illustration, it consists of two runways, sloping toward the right into a can drop at the right-hand side. From the drop, a third runway sloping toward the left leads to a belt elevator which delivers the cans to one of the can-ways near the ceiling. There are two levels from which cans can be fed into the machine.

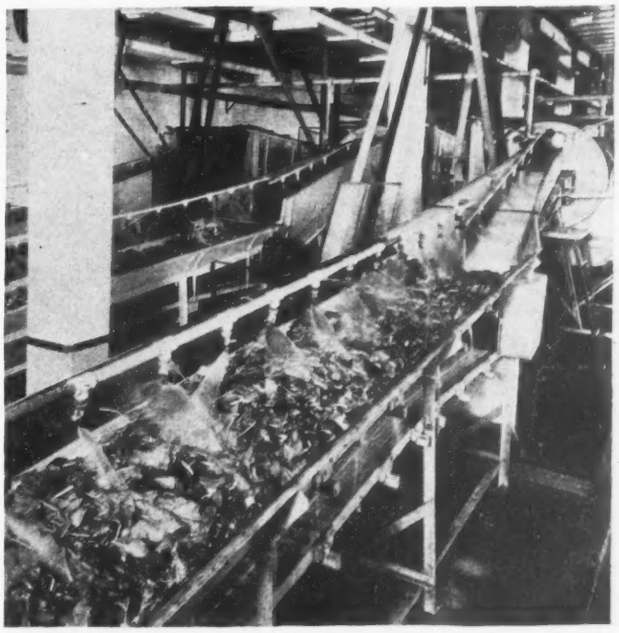
Either from bins or from cars by way of the can-ways the cans drop to the first floor, where five men place twelve No. 2½ cans bottoms up on trays, fifteen trays making a two-wheel truck load. Two truckers take these trays of cans and stack them in an open space between the first line of processing equipment and the south side of the building. From here three men take the stacks of trays of cans directly to the aisles between pairs of canning tables. Other sizes of cans are trayed up directly from cars or from paper packages and are then taken to the canning department in the same way.

In the canning department two checkers to each table place the trays on the top shelf of the canning table, from which the canner removes one to the lower shelf. An empty tray is placed on the middle shelf. The filled cans of fruit are placed on this empty tray. The checker removes the tray of filled cans, punches the canner's piece-rate card, and replaces the tray of filled cans with a tray of empties. The canner then fills the empty tray on the lower shelf. Space in front of her is sufficient for four trays, which gives her a little extra working space in the event the checker does not get around promptly to remove her full trays.

This scheme is followed if fruit or other products are being canned exclusively in No. 2½ cans. Otherwise, in front of the canner are trays of different sizes, such as No. 1 and No. 2½, or No. 1, No. 2½, and No. 10, as sometimes happens in canning pears.

The trays of filled cans are now placed on racks

Fig. 10—Spinach sorting belt with water jets of 35-lb. pressure playing on the spinach



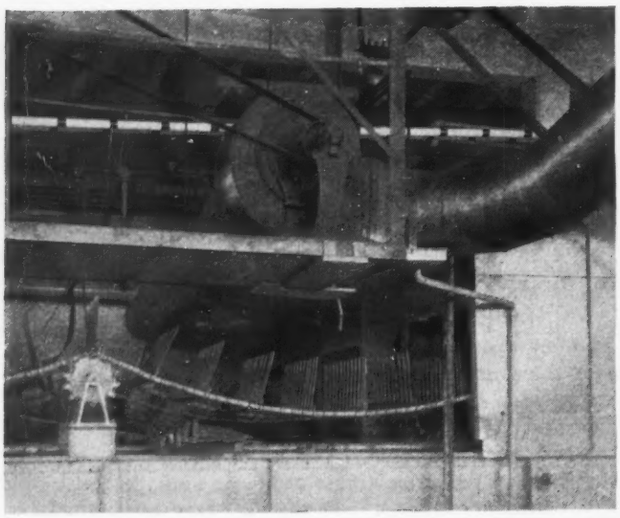


Fig. 11—In the spinach blancher, the forks shown moving toward the feed end, pick up spinach and move it through on their return trip

mounted on casters, much like those used to bring pear halves to the canning tables. These racks hold twelve, fifteen, and sometimes eighteen trays, though no attempt is made to fill them completely before delivering them to the syruping machine. The checker makes the round of the canning tables with a rack, takes off such trays as are filled, and transports them immediately to the

Fig. 13—Filling cans with blanched spinach, which is about 170 deg. F. in temperature

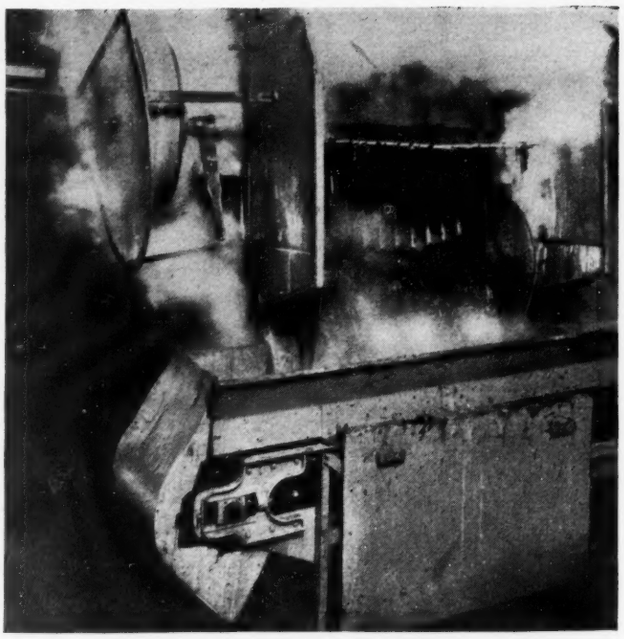


Fig. 12—Spinach leaving blancher drops onto drainage conveyor before going to canning tables

syruping feed disks. At the syrupers another worker empties the trays onto the feeding disks and stacks the trays to one side to be returned to the traying-up tables.

The three-sided trays are taken from the rack by the operator at the syruper feeding disk, who pushes the cans off the trays onto a slowly revolving disk that lines the cans in a single file and delivers them to the drainer and syruper, where the appropriate charge of syrup or brine is added.

Syrup is made in three jacketed copper kettles. Cold water is let into the kettles up to a mark previously determined and sugar dumped in from the floor level above, the kettles having been placed in a pit so that the tops of them are level with the factory floor. The quantity of water is chosen so that whole bags of sugar—six or twelve, depending upon the kettle size—will make up a batch of syrup of about 60 deg. Brix.

From the kettles the syrup is pumped by one of the duplex steam pumps into one of three 400-gal. glass-lined tanks in the syrup room on the floor above. The man in the syrup room controls the activities of the syrup makers on the floor below by bell signal. When the glass-lined receiving tanks are empty he signals for a fresh batch to be pumped up into them. Each 400-gal. tank has syrup, water, and steam pipes. The syrup is strained through cloth strainers as it enters the tanks.

From 60 deg. Brix. the syrup is "cut" to the proper strength required for the several grades of fruit being packed. The approximate quantity of water is run in as determined by marks on the side of the tank and the syrup then is heated by live steam. A sample is taken, cooled by pouring it through a pipe coil surrounded by cold water, and the specific gravity in degrees Brix is determined. A temperature correction chart covering several degrees temperature is provided to avoid delays that would be occasioned were the temperature of the syrup adjusted to a definite temperature before testing.

The cut syrup flows by gravity into one of nine tanks just under the receiving and cutting tanks, which have been placed on a small platform in one corner of the syrup room, making a sort of mezzanine floor. Seven of these tanks are 200-gal. tanks, the other two being 400-

Fig. 14—Preparation of tomatoes, showing merry-go-round conveyor

gal., the latter being used for syrup of the most commonly used strength. Other equipment of this room consists of a wooden hot-water tank to furnish water for water packs and for other purposes on the cooking floor.

The syrup in the glass-lined storage tanks is heated by closed coils; in the receiving tanks by open coils. The syrup lines are 2-in. galvanized iron pipe painted white; steam pipes are 2 in. in the receiving tanks and 1 in. in storage tanks, lagged and painted yellow. Water lines are 2-in. lines painted green. The syrup is strained twice; before cutting and again just before it enters the storage tanks. The steam and hot water from the closed heating coils in the syrup storage tanks are run into the sewer, the quantity of steam required at this point being insufficient to justify traps and return pipe to boiler.

Brine is made in one of three 500-gal. wooden tanks in the sauce room. These are heated by open steam coils. For pear blanching a $2\frac{1}{4}$-per cent brine (9 deg. salinometer) is used, although for canning spinach and other vegetables different strengths are required. The salinometer scale is used for testing brine strength.

Gravity flow of syrup to the syruping machines is used from the syrup- and brine-making departments on the second floor. In Fig. 20 a manifold piping system is shown, so arranged that storage tanks are directly attached to pipe lines and the possibility of mixing syrups of different strength in the same pipe line is eliminated. Gravity flow direct from storage tanks greatly simplifies cleaning, for it is necessary only to drain syrup out of a line and flush it out with the hot water and steam at the close of the day. Before the next day's operation begins the syrup lines are again flushed with steam before letting syrup run into them.

Returning to the movement of the filled cans which were left at the syruper, when the style of pack going through one line of processing equipment is changed, the operator shifts to the proper syrup or brine by means of a flexible hose connection. After syruping, cans move into the exhaust box, then to the seamer, and then into the cooker or retort, depending on the product being packed.

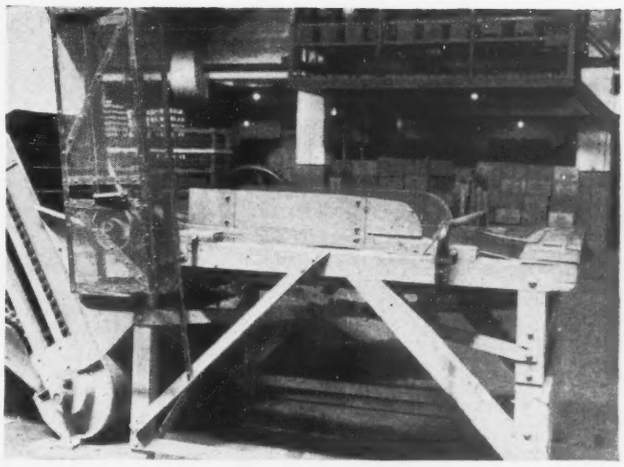
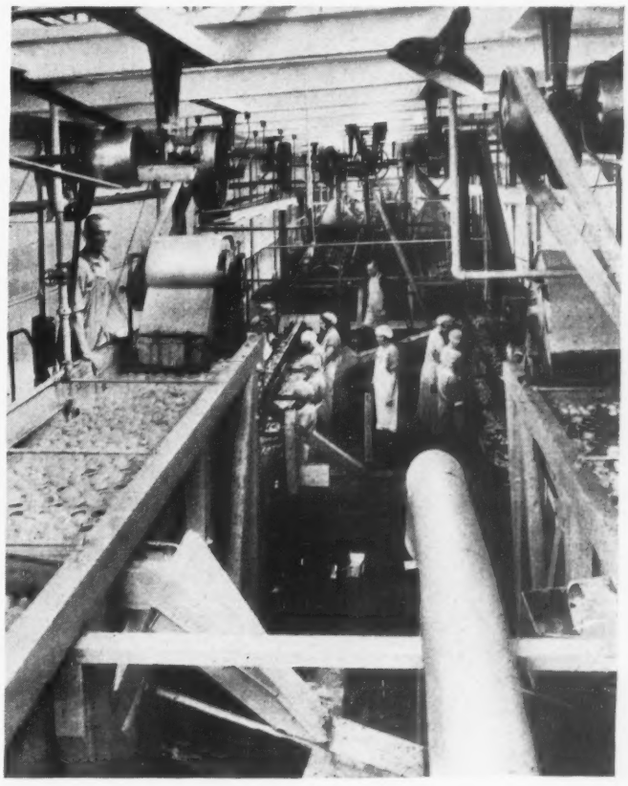


Fig. 15—Halved and pitted peaches are dumped on this oscillating table which screens out waste and delivers fruit to conveyor shown at left

As the cans leave the double seamer they pass through a can-turn which turns them over on their sides and allows them to roll onto the drag chain conveyor that carries them overhead and into the cooker. The first portion of the conveyor through which the cans travel is surrounded by a metal jacket inside of which are hot-water jets, so that any syrup or spilled fruit is washed off the cans before they enter the cooker. In some factories of limited floor space the sealer and cooker are close-coupled, but if space is available it is worth while to have an aisle between these pieces of equipment, as shown in Fig. 21, particularly if there is a long line of them, as there is at Plant No. 11, which has fifteen lines of process equipment.

When cans leave the continuous cooker they roll down

Fig. 16—Looking down the peach peeling and grading room, with lye peelers in the background, then sorting belts and rotary washers, and grader in foreground



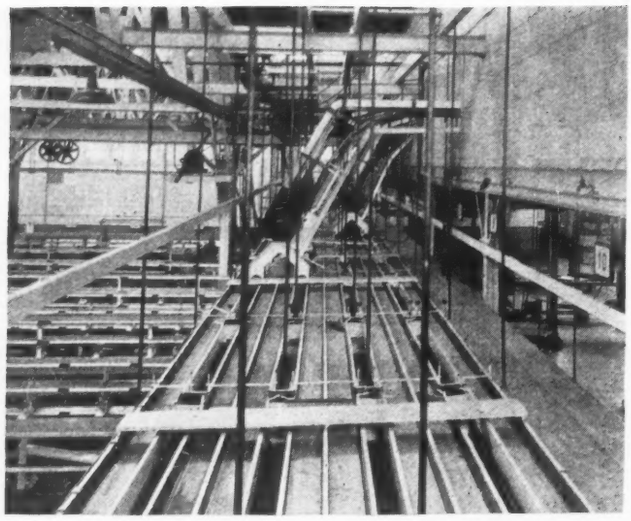
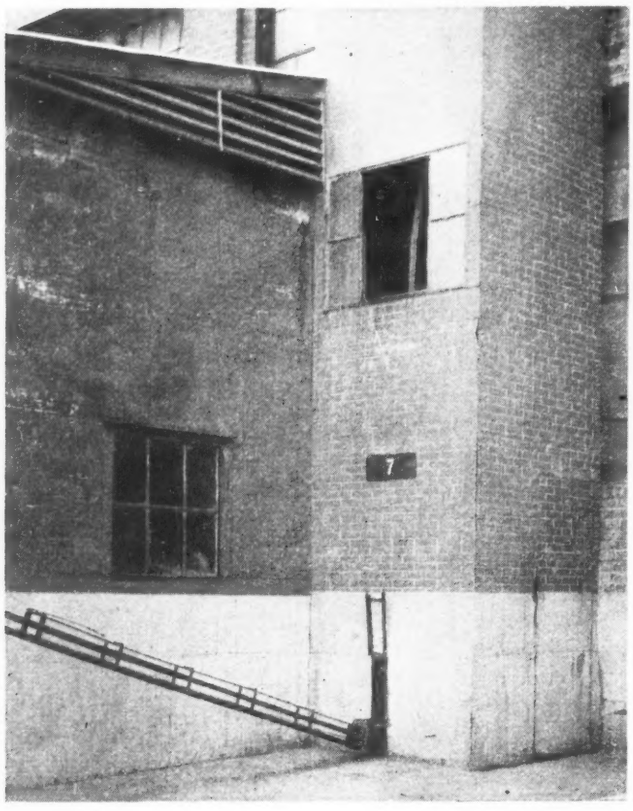


Fig. 17—These distributor belts carry peach halves from grader to canning tables, depositing any required size on any table

a short inclined track into a similar looking piece of continuous equipment containing cold water, where they are cooled to 125 to 130 deg. F. From the cooler another drag chain conveyor carries the cans up a short incline, down which they roll into a traying-off machine. Cans coming from the cooler are placed on a three-sided wooden tray previously used for holding empty or unsealed cans and stacked over night on the cooling floor, shown in Fig. 22. After testing for vacuum they are then trucked into the warehouse the next morning.

Cans of non-acid vegetables bypass the cooker and cooler and roll directly to the traying-off machine, where they are placed in metal baskets made of strap iron. The iron baskets containing cans for retort cooking are

Fig. 18—Base of can elevator on north side of building



stacked on iron retort cars which, in turn are carried on stout, flat-bottom, four-wheel trucks. The retort car is held in position by angle-iron tracks screwed to the floor of the trucks, and is locked in place by iron rods. When a car is loaded the truck which carries it is pushed to the retort door. Angle-iron guides that receive the truck wheels on the floor in front of the retort automatically line up the tracks inside the retort with the track on the truck. After the retort cook, the cans are

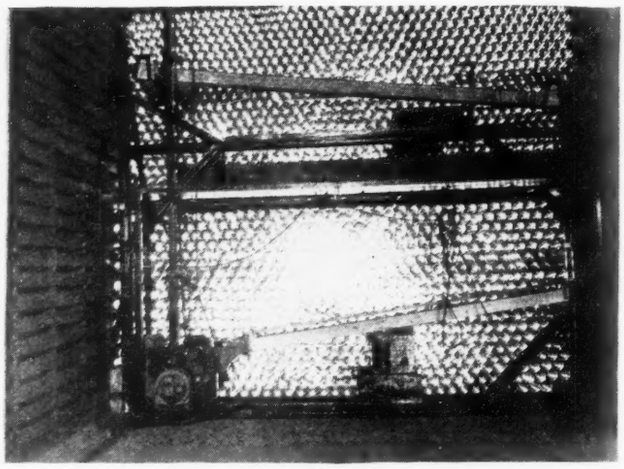


Fig. 19—Traveling can elevator used in can bins for transferring cans to cableways

stacked on the cooling floor in the same manner as other products.

Pulped tomatoes are pumped from the pulpers to storage or measuring tanks by duplex steam pumps like those used in pumping 60-deg. Brix. syrup from melting

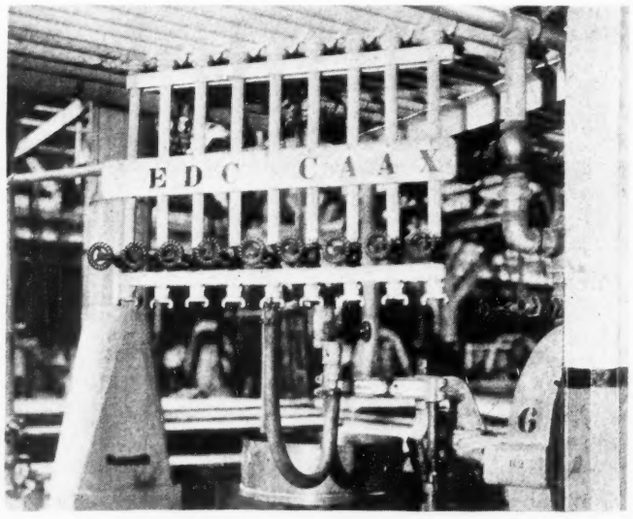


Fig. 20—Syrup and brine manifold, showing hose connection for quickly shifting from one syrup to another

kettles to syrup rooms. The unconcentrated pulp is heated immediately after leaving the pulpers, necessitating that the pipe lines carrying it be lagged to maintain their temperature. The piping is bronze and the lagging is painted white with red bands for identification purposes.

From the measuring or storage tanks the pulp flows by gravity into the cooking tanks. The distance from measuring tanks to cooking tanks is only about 4 ft., thus permitting a short connection between the two by means of a short open trough that can be removed when a

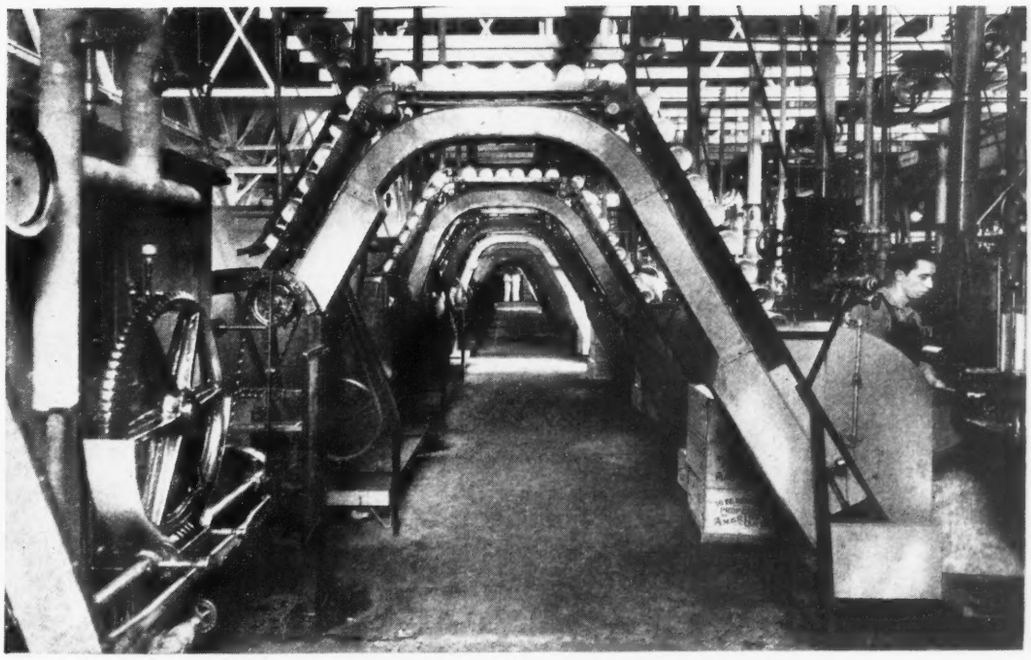


Fig. 21—The aisle between double seamers and cookers in the cook room, showing conveyors over aisle

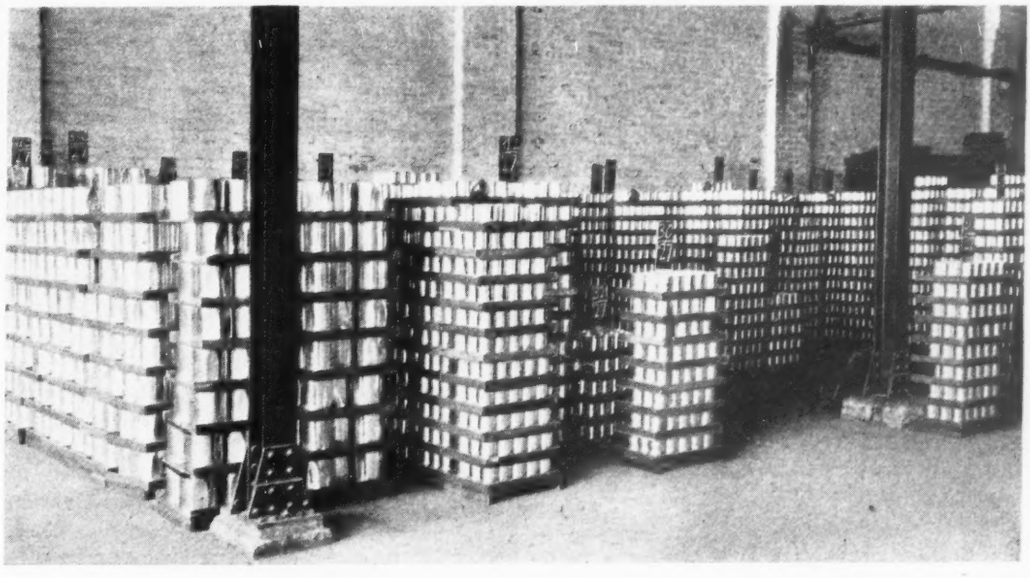
measured batch has flowed into the cooking tank. The batch is then cooked down to its required concentration. Rotary pumps draw the sauce from the cooking tanks and deliver it to the finisher, a continuous rotary sieve, from which it flows by gravity into the tomato-sauce lines in the cook room below.

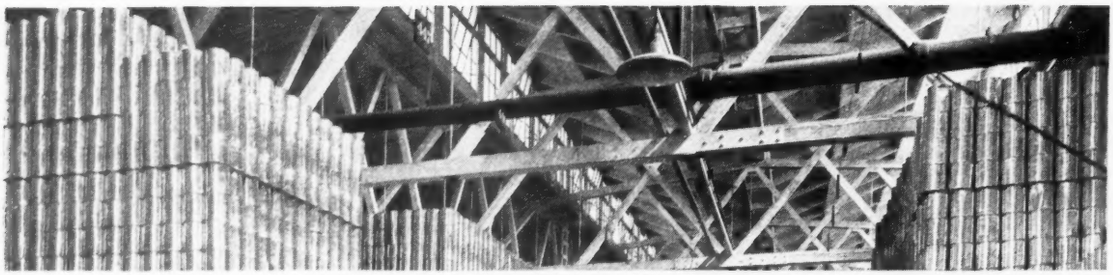
In the meantime 7-oz. cans have been unloaded on the upper siding at the north side of the plant and started down the can-ways to meet the hot sauce at the filling machines. The cans are filled with sauce, sealed, cooked, cooled, taken by the conveyor to the warehouse, where they roll at once through labeling machines and are then cased. This product is handled rapidly and comes nearer to being completely mechanized than any other products packed at this plant.

Catsup also is made in the sauce room in similar equipment, and is handled in much the same fashion as sauce. This is the only product in which vinegar is used, hence no elaborate vinegar storage or handling equipment is required. Vinegar is pumped by a hand-operated pump directly from the barrels in which it is received into a small measuring tub and from there allowed to run by gravity directly into the catsup cooking tanks.

Materials handling equipment at Plant No. 11 is simple, as it must be in a plant designed to produce a variety of products. Like the machinery used in the preparation, canning, and processing, materials handling equipment must be able to handle a series of products during the season. Otherwise it would occupy space, and would have to carry a charge for ground rent and contribute to the overhead all year, even though it might be in use but a few days. Equipment for some products, both handling and preparation, has been highly specialized, such as tomato and spinach equipment, for which it is a necessity in any plant packing those products. But additional specialized equipment, limited to short seasons of use and requiring permanent installation, should be considered carefully before its installation.

Fig. 22—Trays of cans on the cooling floor, with code marks showing





Warehousing a Million Cases

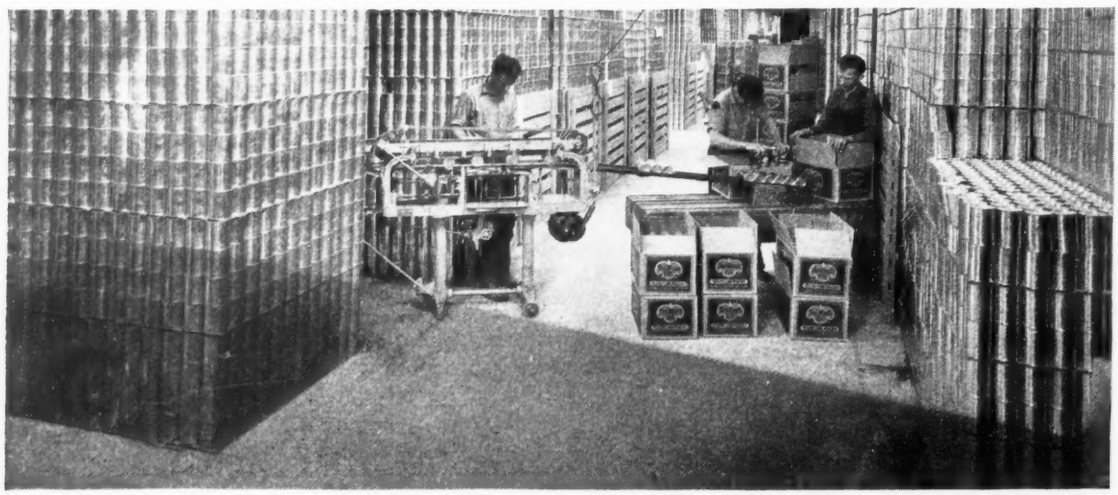


Fig. 1—An aisle in the warehouse, showing a labeling machine crew at work. The floor-plan numbers are shown overhead

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Assistant Editor
Food Industries

TWICE since Plant No. 11 of the California Packing Corp. was completed, the annual pack has exceeded 1,000,000 cases—in 1926 and again in 1928. The 1926 pack of 1,250,000 cases constitutes a record for fruit and vegetable canneries; some of the Hawaiian pineapple canning plants have packed more, but they run continuously on a single product. With a pack as large as this, handling, labeling, packing, and shipping must be efficiently organized and operated. Because this plant is a concentration point for making up composite cars of canned goods, warehouse methods must be planned to take care of goods shipped in from other plants as well.

The warehouse proper occupies about half of the building of Plant No. 11. Its construction is continuous with that of the remainder of the plant and it has the same type of wood roof truss construction. To the north, a room the full length of the warehouse has been set aside for storage of box shooks, flat cartons, nails, wire, adhesives, and box-making and carton-printing machinery. The foundations of the warehouse are the same as those of the remainder of the building; that is, concrete piers placed at the corners of 7-ft. squares with a solid earth fill under the floors. Walls of the warehouse are of brick on all sides, including the partitions between the warehouse and the cook room. Interior doors between cook room and warehouse and between warehouse and carton storage room are automatic, steel, double-curtain fire doors. The outside doors are single fire doors. A loading bay for two trucks has been set in the southwest corner. Along the south wall are also a label storage room, which is simply a portion of the warehouse separated from the main portion by a wooden partition; an office next to the truck-loading bay; and washrooms for men and women.

Skylights Aid Ventilation

The whole warehouse space under the roof is about 250x500 ft. With two skylights, each with windows facing north and south, light and ventilation are excellent. Windows in the monitor roof may be opened, and it is customary to leave all doors of the warehouse open during the summer. In the winter some heat is occasionally necessary to prevent sweating of the cans, and four stoves are placed at intervals through the warehouse to supply it.

The floor space is divided by three aisles running east and west and three running north and south. One east and west aisle is through the middle of the warehouse and the other two are about 15 ft. from the north and south walls.

Unlabeled cans are brought into the warehouse from the cooling floor at the west end of the cook room. These cans are on wooden trays, usually 6, 12, or 24 cans to the tray. Three warehousemen record the num-

ber of cans on the cooling floor before they are brought into the warehouse in the morning. As a check against the warehouse record, counters are used on the elevators leading to cookers from the double seamer to show the total number of cans passing through the double seamers during each operating day. From the trays, which are brought in on two-wheel trucks stacked about ten high, depending upon the size of the can, the cans are removed and stacked. The portable wooden gates shown in Fig. 1 are used to protect the warehouse stacks from damage by passing trucks.

Stacking Plan Gives Rapid Count

The floor of the warehouse has been marked off into spaces 4 ft. wide and of varying length. There are 66 spaces about 166 ft. long and 130 spaces about 16 ft. long. A number painted on a board (see Fig. 1) is suspended above each space to identify it on the warehouse floor plan. Laths placed at regular intervals throughout the stacks not only tie the stacks together and aid ventilation but are arranged to facilitate warehouse counting.

Suppose, for example, that No. $2\frac{1}{2}$ cans are to be stacked in space No. 447. A row of twelve cans will just fill the 4-ft. space between the floor markings. Single laths are placed across this 4-ft. space one can-diameter apart, supporting the adjacent segments of the cans that make up the first four rows. Where the fifth and sixth rows of twelve cans come in contact, however, two laths are placed side by side, so that the sixth row becomes the first row of a new series of five that begins with each double lath. Thus, in a horizontal plane, we have successive units of five rows, with twelve cans to a row, identified by the double lath. In a vertical direction, cans are stacked four high, and then another set of laths is put in place. These units of four are repeated on up the stack. Each stack, therefore, is made up of a number of these 5x12x4-can units, or "breaks," as they are called, containing 240 cans, or ten cases. To count cans in the warehouse, it is only necessary to count the "breaks," set off by the double laths.

Cans usually are stacked 75 cases—that is, 30 cans—high. Cans of other sizes, smaller and larger, have different stack arrangements, but all are built up in similar "breaks" to aid in counting. As the roof of the warehouse is borne on wooden trusses supported by wooden posts set in the floor, it is necessary to make some allowance for these posts and the diagonal bracing to the roof trusses. At these points complete "breaks" have been omitted from the stacks, but the number of cases

Fig. 2—A can-way used to feed cans to the labeling machines from the top of the stack

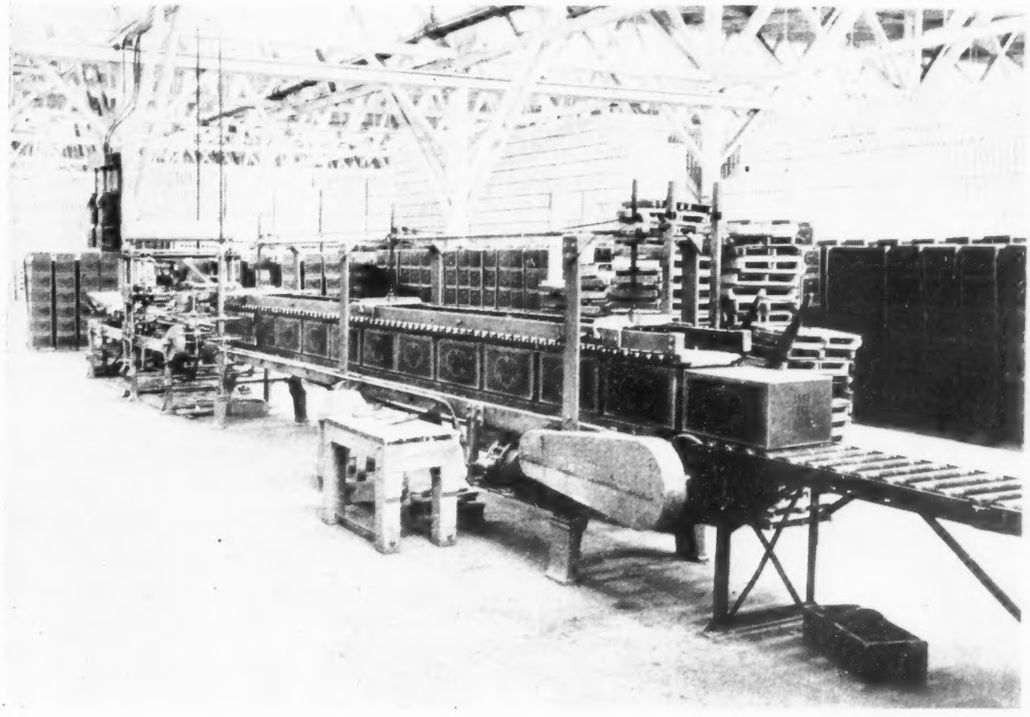


Fig. 3—Top and bottom case-sealing machine. In the background are the huge stacks of cans

omitted for each post is known and allowance made for it easily.

Very little warehouse stock is stored in cases, and practically all of it is goods awaiting shipment. The exception is tomato sauce, which is labeled and cased as rapidly as it is brought into the warehouse.

The system of stacking and of numbering the stacks just outlined makes the keeping of perpetual inventory fairly easy. Freshly canned material is counted before being brought into the warehouse and the record of this count is then added in the warehouse stock book. Likewise, goods shipped are subtracted from this record, as are all cans removed for samples, and the occasional "swells," defective, or damaged cans that are found in stacks.

Labeling machines, as shown in Fig. 1, are used on all sizes of cans except No. 10 and gallons, which are hand-labeled. The labeling machines are mounted on casters, and can be wheeled quickly to any part of the warehouse. Electric outlets have been placed at frequent intervals throughout the entire building, but especially so in the warehouse. Seven drop cords are found in each north and south aisle and thirteen in each east and west aisle, or about 90 scattered throughout the middle of the warehouse. In addition to this, there is an outlet alongside each outside door, so that a labeling machine can be set up almost anywhere. The can-way shown in Fig. 2 is used to feed cans from the top of the stack to the labeling machine. Four men usually make up a labeling crew, one taking cans from the stack, one feeding the machine, one packing into cartons, and one trucking the cartons away.

Fig. 5—This nailing machine expedites box making. There are four such machines at the plant

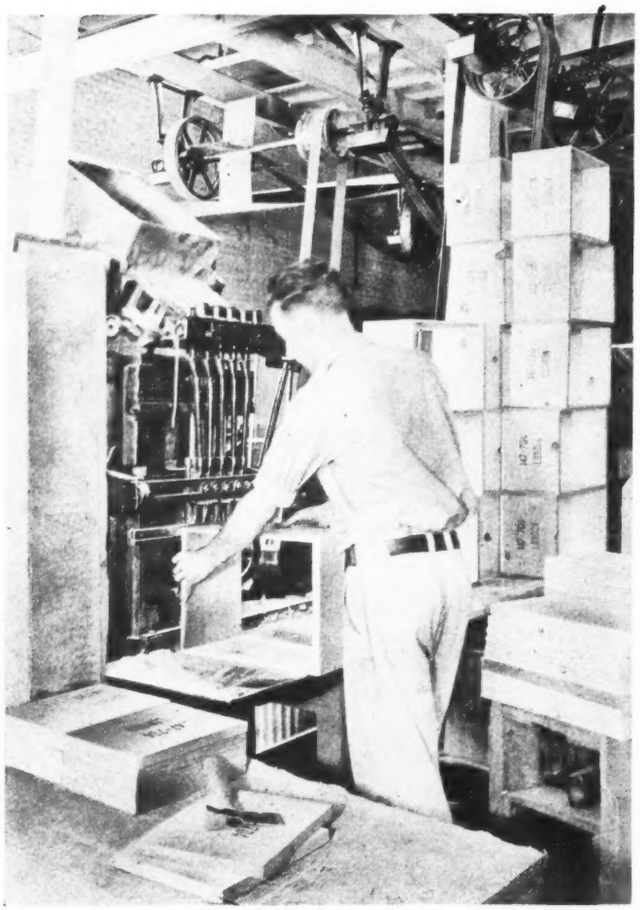


Fig. 4—Trucking filled cartons to the sealing machine

Packing into cases is normally done by hand as the cans leave the labeling machine. This year, however, pneumatic casers for 7-oz. cans are being installed for use on tomato sauce. This will make the flow of cans from empties in box car to filled, labeled, and cased goods in the warehouse almost continuous for this product. The greater part of the goods are packed into fiber cartons, although wooden cases are used for export shipments, and to a certain degree for domestic shipments as well. Fiber cases are received flat with the Del Monte trademark and shield printed on the end. At the plant the name of the contents of the case are printed in a space left blank at the box factory. Printed cartons are then hauled near to the labeling machine on flat-bodied four-wheeled trucks. The filled cases are carried away by a two wheel cannery truck (Fig. 4) to one of two top and bottom sealing machines such as shown in Fig. 3.

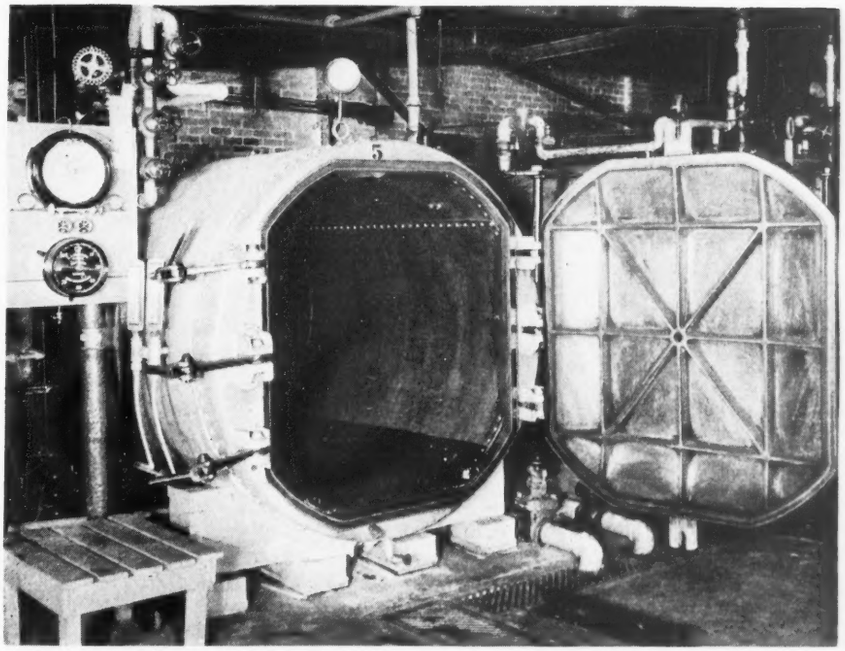
Wooden boxes are made and printed at the plant. Four nailing machines are used to put the boxes together (Fig. 5). After being filled with cans, the lids are nailed on by hand, and if for export, a wire tie is put around the middle of the box.

Shipments by Water Are Large

For freight shipments the cases are loaded at once into cars on sidings either at the north or south side of the building. Of late years a considerable volume of shipment by water to a concentrating station at Alameda, on San Francisco Bay, has been carried on. For this work the cartons or cases are loaded onto skids. These skids are then transferred by pneumatic lift trucks onto a motor truck in the loading bay and are in turn unloaded directly onto a river boat to be carried to the shipping point on San Francisco Bay. They may be even loaded into the hold of an ocean freighter before removal from the skids on which they were loaded at the sealing machine in Sacramento.

Accurate Production Control Maintains Quality

By J. W. SHUMATE
Assistant General Superintendent
California Packing Corporation



Among the control instruments on this recorder, the two mercury thermometers, the recorder-controller, and the pressure gage are required by law, while the time indicator is supplementary equipment

PROCESS control at Plant No. 11 begins with the arrival of a truckload of fruit at the receiving platform or a carload on a railroad siding when sample boxes are examined. Two objects are in view: first, to see that the fruit is up to the grade specified in the grower contract; and, second, to see how the fruit is going to fit into the scheme of factory operations. To illustrate the latter: experience has shown that Bartlett pears differ in ripening time, in behavior after peeling, appearance, flavor, texture after cooking, according to the locality in which they are grown. For best and most uniform results they should be segregated accordingly. Peaches and other fruits show similar differences. The foreman in the green fruit department, therefore, keeps close check on the quality of raw material arriving, and endeavors to keep raw material of uniform quality going into the preparation department.

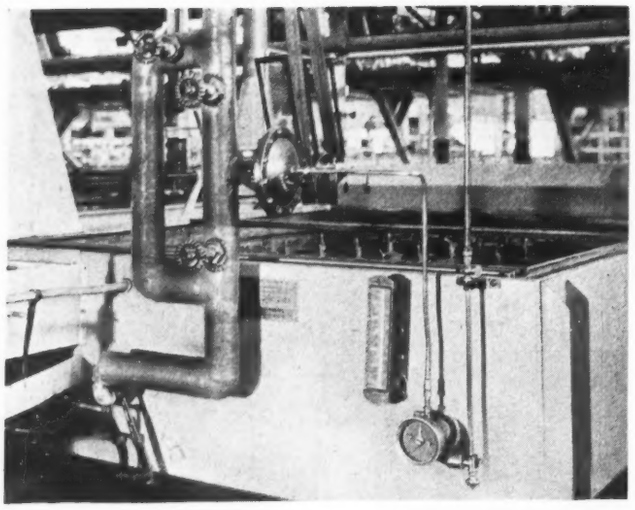
Careful preparation—using the word in the canners' sense of preparing the fruit for canning—is the first step to assure an attractive appearance when the can is opened. Fruit of extra fancy quality, as far as shape, maturity, flavor, and texture are concerned, may easily be lowered in grade by careless peeling, halving, pitting, coring, or trimming. In our preparation departments, therefore, we endeavor to secure careful treatment of the fruit as far as any cutting operations are concerned and likewise to get a first separation on a quality basis and, in some cases, on a size basis.

Spinach is picked over, plant by plant, the roots and long-stemmed lower leaves are trimmed off, and yellow leaves and foreign matter removed. Thick, heavy, stems are cut off and leaves with heavy midribs removed. Plums are stemmed and sorted according to color. Tomatoes are peeled and cored; peaches are halved and pitted; pears are peeled, halved, cored, and stemmed. Peaches are sorted for color and those obviously unsuitable for canning are separated out here. A color sorting is made on the basis of deep yellow, fully colored fruit, and fruit which is paler in color, so that it may be run through the peeler separately. Pears are separated into sizes and there may be a quality separation also, other than the usual one of trimmed or pie stock and fruits unsuitable for canning.

The work of the "cutters," as those in the preparation department are called, is under continuous supervision by the foremen and subforemen, forewomen and subforewomen of this department, who examine all the prepared fruit and make the necessary corrections of either size or quality separation.

The next step, canning, provides another visual inspection for quality. Spinach and peaches get still a third. Spinach is inspected before washing, while peaches are examined after they leave the lye peeler. Some defects which make peaches unsuitable for canning may not become apparent until after the peel has been removed. Consequently, the halves are examined just before they enter the size grader and imperfect fruit requiring trimming or rejection is removed.

At the canning table the canner examines the product she is handling, be it spinach, tomatoes, peaches, pears or other fruit, and rejects those pieces which are unsuitable for canning, and at the same time corrects any errors in sizes that may have persisted this far. Many of the peach halves thus rejected are sliced. The slicing halves are those which have such minor defects that perfect slices may still be obtained from them. After slicing, the slices are again examined and sorted, imperfect slices being thrown out. The canner's work is inspected by the forewoman or subforewoman in charge of the table, so that when the filled cans finally go to the syrupers, at least four people must have made mistakes if the quality of the canned fruit is not what it should be. As



In operating this control on an exhaust box, the desired temperature is set on the controller at the right and checked by the indicating thermometer

a further check, one man goes around continually, marking cans in indelible ink with the number of the canner who fills them. These numbers persist on the cans through the entire cooking operation, and the daily sample cuttings are made from numbered cans only. A report on the canner's workmanship is returned to her following the daily examination, so that the report acts as both a check and a spur on the canner's work.

When the checkers pick up the filled cans and take them to the syrup feeding disks, manual control over the product ceases. Heat application begins here, and the subsequent operations are controlled entirely by instruments. Temperature in the exhaust box is controlled by a temperature regulator operating a diaphragm valve in the steam line. To aid in setting the temperature controller, an indicating thermometer with its bulb inside the box is placed near by. Experience has shown the relation of the temperature of the exhaust box and the time required for a can passing through it to get the proper temperature at the center of the can.

One man of the cook-room force does nothing else but move up and down the lines of processing equipment to inspect their operation. He selects a can as it emerges from the exhaust box and thrusts a tested thermometer into the center, making a record of the temperature indicated. He then quickly draws a line in indelible ink around the can and lets it go through the double seamer. After the seam has been rolled, painted dummies are placed ahead and behind the marked can before it enters the cooker, so that the man at the traying-off machine can identify it as it comes through, for he sees only the ends of the cans. He removes the marked can to one side, where it is later picked up. At the time the can is marked a record is made of the temperature of the cooker and the number of minutes required for the cook. On the next morning the vacuum in the can is tested, the can is cut open, and the contents examined. A record is kept of this information on a form containing the following headings: Can mark, the line number, the temperature of the exhaust box, the temperature of the center of the can after exhaust, the number of minutes through the exhaust box, the temperature of the cooker, front and back (that is, two thermometers); the number of minutes to pass through the cooker, the gross weight of the can, and the inches of vacuum.

Besides this, a separate record is kept of the temperature of the syrup placed in the can, the temperature of the exhaust box, the number of minutes of exhaust, the temperature in the center of the can, the temperature in the cooker, and the number of minutes cooked. This record is made every 15 min. throughout the operating period every day. In addition, gravity tests are made at regular intervals on the syrups, to be sure that the proper strength is being used. This also serves to check the operations of the syrup maker.

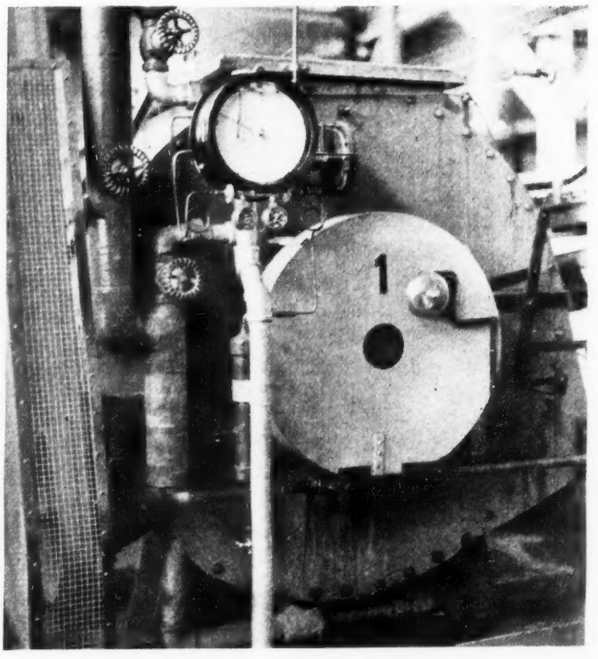
The purely mechanical operation of the double seamer likewise is checked periodically. By means of a steel gage the thickness, outside height, and inside depth of the seam are measured. Also, selected cans are filed open at the seam so that its formation may be examined.

This discussion would not be complete without mention of the California Cannery Inspection Law, which went into effect in 1925. Funds for maintaining state inspection service are contributed by the canners, who pay into the state treasury a tax based on the number of cans they purchase from can manufacturers. The products inspected include in general those non-acid vegetables which require retort cooks, such as spinach, asparagus, string beans, and olives. Tomatoes and tomato products, sardines, and tuna also come under the law. There is no prescribed cook for tomatoes or tomato products.

Retort equipment must be approved by the cannery inspection service. Each retort must have a pressure gage, two suitable mercury thermometers, and one recording thermometer. The size of steam headers, the number of bleeders, and the general arrangement of the retort cooking department must be approved by cannery inspectors before a license will be issued. Further than this, those in charge of retort operation must be examined and licensed by the chief inspector.

A state inspector visits the cannery at least once during every operating day and may visit it several times, depending on the size of the territory he has to cover. This inspector is on duty at all times when the cannery or canneries he is to inspect are operating, whether it is

This automatic temperature control on a cooker is supplemented by indicating thermometers at this and the other end of the machine



night or day, Sunday or holidays. He pays particularly close attention to retort operation, but also makes note of the general sanitation of the plant and equipment, and the quality of the raw material being packed.

The retort operator keeps a complete record of each cook in each retort. This record must show the serial number of the recording thermometer chart, the number of the retort in which the cook was made, the number and size of the cans, the products contained in them, the time at which the steam was turned on, the time required for the retort to come up to cooking temperature, the time of cook, the readings of the mercury thermometers, recording thermometer, and pressure gage at the beginning and end of the cook, and the length of the cook in minutes. The inspector examines this record, examines the cans the record describes, checks the record against the recording thermometer charts and, if all is satisfactory, releases the batch. Each retort load is considered a batch, and the number of the retort and the number of the batch are stamped or embossed on each can. Each cannery also has a registered code mark which is embossed in the can lid. It is thus possible to trace any can which comes under the cannery inspection law, to a definite cannery, day, retort, and batch number, for which a complete temperature and processing history is kept.

In the event that the products have not been cooked according to law, they are either reprocessed or sample cans are incubated before the batch is released.

In addition to the equipment required by the cannery inspection law, each retort at Sacramento has a time control, so that the time of each batch can be accurately determined and there will be no confusion about the time for any given retort.

Sterilization by heat is a product of both time and temperature. The usual practice is to keep temperature constant and make time the variable factor. This is followed in cooking operations, both at atmospheric pressure and in cooking in retorts under pressure. Of course, rate of penetration of heat also is a factor which depends on the product, the style of pack, and the size of the can. In the case of spinach the fill-in weight is a very important factor in determining the rate of heat penetration. A batch that has a satisfactory temperature record as far as the actual cook is concerned may be quarantined if cans are overweight and hence the degree of heat penetration may be presumed to be in doubt.

In those products which are processed at atmospheric pressure, the time of cook is governed by the same factors, though neither such high temperatures nor such long times are used as for retort-cooked products.

Because cannery processes have been so well worked out, very little laboratory control is required. While the California Packing Corp. has extensive laboratory facilities in San Francisco, its twelve chemists and bacteriologists exercise no direct control over processing. They do, however, make check tests on finished goods. The essential function of the research department is investigational, not control, work.

Dummy cans of this style sent through the exhaust box ahead of a new type of pack are provided with the bead shown, which prevents passage through the sealer and stops the line until the operator changes the die and removes the dummy

In this factory sample room, cuttings are held each morning on cans marked during the previous day's operation

Aside from laboratory check tests, factory process control depends mainly on organoleptic tests. Each morning samples from the previous day's pack are cut in the presence of the superintendents, foremen, and forewomen. Those responsible for the quality are able to see how the pack is running and take steps to correct faulty workmanship in preparing, over- or underfilling, or inadequate or overcooking. If abnormal cans appear that are not explainable or correctable in terms of the experience of those present, samples of the lot are sent to the San Francisco laboratory for further examination and study.

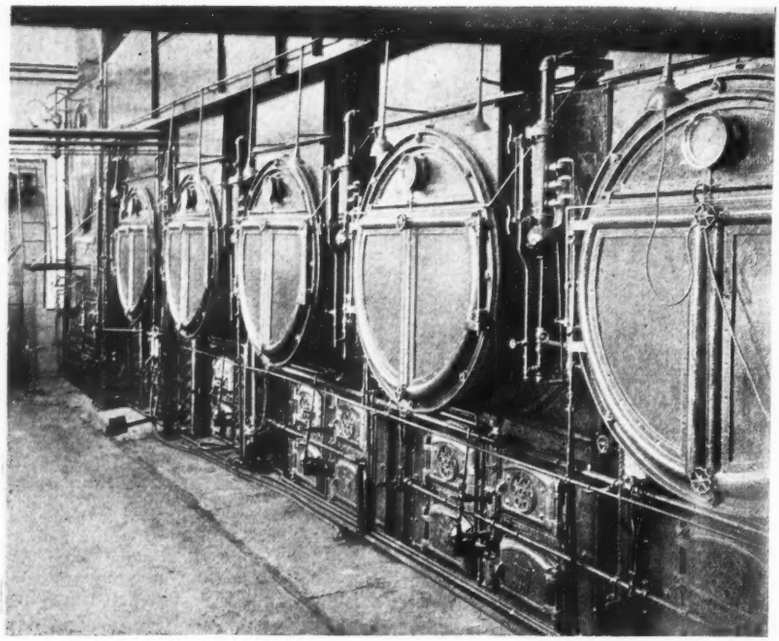
At least once each week a "cutting" is held at which the division superintendent is present so that he may have first-hand knowledge of how the pack is running. Periodically samples are sent to San Francisco for incubation tests. These tests are made on both fruits and vegetables. Fruits are incubated at about 90 deg. F., or temperatures chosen to simulate about the maximum temperature that is to be expected under average commercial storage conditions. Vegetables are incubated at higher temperatures to detect thermophilic organisms.

The incubation method of testing the effects of storage at different temperatures on canned products is very common, and is largely responsible for the safety and generally high quality of canned food products today. It is empirical, but it has yielded results of great value.

Of all the products packed at the Sacramento plant, only tomato sauce and catsup require any special instruments of production control at the factory. Visual examination of spinach, beets, carrots, peaches, pears, and tomatoes for canning is sufficient to maintain a high quality when such examination is backed up by daily cuttings and incubation tests in the laboratory. In the manufacture of tomato sauce and catsup, and cooking it to definite consistency and solids content, it is of considerable assistance to the operator if he is able to make tests of total solids and viscosity before and during the cooking period. Consequently, we have set up in the tomato-sauce department at Plant No. 11 a bench with a couple of small finishers and an immersion refractometer. Total solids in raw pulp are determined with the refractometer so that some idea may be obtained as to the degree of concentration necessary and as a measure of the finishing point. Besides these factory tests, hourly samples are taken and sent to San Francisco for filament mold counts by the Howard method.

Simple Steam Equipment Fits Needs of Seasonal Industry

By P. L. BUSH
Chief Engineer,
California Packing Corporation



Six oil-burning boilers with 1,080 boiler horsepower rating supply the steam needs of Plant No. 11

THE major consumption of steam in fruit canning plants is for process purposes. Few canning factories are driven by steam engines and belt drive, although some generate their own electrical power with turbines and use the extracted steam for processing. The advisability of doing this depends on the availability of other power sources, the cost of electricity, the availability and cost of fuel, and other local factors. In only a very few of our plants is steam consumed for production of motive power from the steam engine; there are some installations of the steam turbine, with use of its exhaust in process work. The steam pump is frequently used both in boiler-room and plant operation, but takes only a small percentage of the total thermal units developed. Generally, however, machinery in our plants is driven by electric motors, either direct-connected or through belt drives. Belt drives are installed for the most part on unit lines, giving flexibility and lower operating cost. In the western states, especially, the prevalence of hydro-electric generating plants makes electric power rates attractive.

Non-Acid Products Require Steam Under Pressure

Since both time and temperature requirements for cooking and sterilizing differ with almost every food canned, steam requirements vary for each product packed. A basic division may be made between non-acid and acid products. Into the first category fall asparagus, spinach, beets, carrots, and most vegetables, which both good practice and state law require to be processed in retorts under pressure at temperatures above 212 deg. F. These make a heavier demand on boiler horsepower than the acid products, such as peaches, pears, apricots, plums, tomatoes, and fruits generally, which can be sterilized at 212 deg. F. (atmospheric pressure).

Present processing technique in the canning factory calls for three major steam-consuming steps in the majority of cases; blanching, exhausting and cooking. In blanching, an open steam coil is used to maintain water at some predetermined temperature, usually boiling. A water blanch is preferred, for the most part, to a live steam blanch.

Exhausters Operate at Atmospheric Pressure

In exhausting, the filled can of raw fruit or vegetables; with its required syrup or brine, is subjected, in equipment under atmospheric pressure only, to live steam for a period of time sufficient to expel dissolved and absorbed air, and to heat the can and contents to a temperature depending on the specific product. The ultimate effect of the exhaust is to produce a vacuum of 8 to 15 in. of mercury in the can when sealed. Following the exhaust the cans pass through the double-seaming operation, which hermetically seals them. Actual cooking takes place either in the "open" cookers or in the retorts, depending on the contents of the can. In the "open" cookers the cans are surrounded by water, air, and steam, kept at boiling-water temperatures by the admission of live steam. At Plant No. 11 (elevation, about 40 ft.), the temperature in the open cookers is 212 deg. F. It is worth remembering that altitude may make a difference of several degrees in the boiling point of water.

In the retort, processing is carried on at considerably higher temperatures in an atmosphere of live steam under pressure. After the retort is filled and the steam

is turned on, bleeder valves are allowed to remain open, not only during the coming-up period but also during the entire processing, to allow complete circulation of steam and prevent the formation of air pockets. Temperature and time of cook vary with the product, and both are governed by state law. At the conclusion of the processing period, the steam is shut off and water and air are admitted under pressure, so that during the cooling period the cans will be under the same external pressure as they were during the processing. This precaution is taken to avoid possible rupture of the cans, which might take place if the pressure around them were reduced to atmospheric while they were still at a temperature above the boiling point of the liquid in the cans.

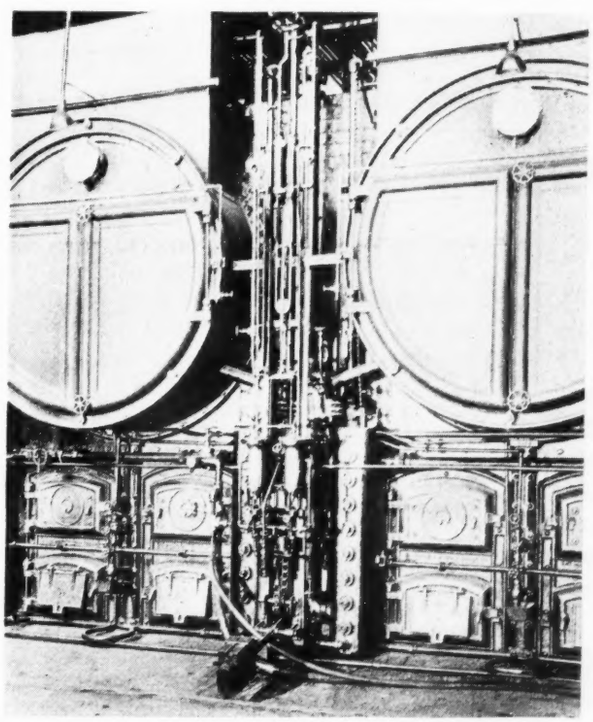
Automatic Control Used

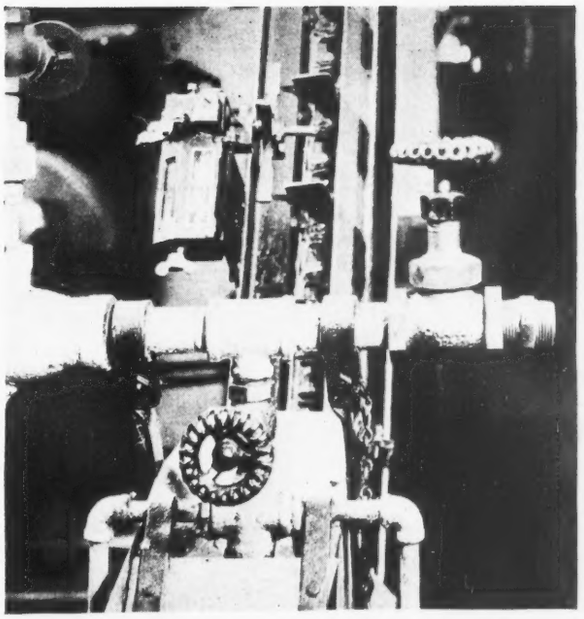
All of the temperatures required in these steps—blanching, exhausting, cooking—are produced by the application of steam, controlled by automatic thermostats set for the temperature required. The usual type of such instruments uses compressed air to operate a valve in the steam supply to the piece of equipment concerned—blanching vat, exhaust box, open cooker, or retort.

The steps just described are those common to all fruit and vegetable canning. Some products require steam for other purposes. Peaches, carrots and other products are peeled by a boiling caustic solution kept hot by passing live steam into it. This use of steam is also thermostatically controlled. In the production of various tomato products, jams and jellies, evaporation is produced in standard steam-jacketed kettles or tanks with evaporating coils of various types fed by steam. From jacketed or closed-coil cooking equipment, condensate is recovered to boilers or feed water heaters by means of standard type traps.

Of the other minor steam requirements in a canning plant, that of washing and sterilizing of equipment during and at the close of the day's operation should be

Automatic maintenance of steam pressure is obtained through the use of the oil-burner control system shown here





Steam for sterilizing purposes and for heating hot water is supplied at convenient points throughout the plant by means of outlets like this

mentioned. Steam for this purpose is piped to a number of spots in the plant where by means of suction tees it may be used either as live steam or to make hot water, as shown in the illustration taken at Plant No. 11.

Probably the best way to appreciate the steam requirements of a cannery is to cite the concrete example of the boiler installation at Plant No. 11, where the boilers are of 1,100-hp. rating and can be operated for peak requirements at 100 per cent overload. Production at this plant has reached some 16,000 cases of peaches per boiler-room operative day of 15 hours, and during tomato operations some 21,500 cases of various tomato products in 16 hours' similar operations.

H.R.T. Boilers Are Standard

The corporation's standard plants have horizontal tubular-type boilers of 150 rated horsepower operating at 150 lb. pressure; at some points these have been increased to rated capacities of 250 and 300 hp. This has been done at Plant No. 11, where the original boiler equipment consisted of five horizontal tube boilers of 150 hp. each; a sixth boiler of 330 hp. has since been added.

Fuel is oil in western plants; coal in the Middle West. Where coal is burned, either stoker-feed or pulverized-coal devices are used. At Plant No. 11, fuel oil is burned, using an oil-burning control device to maintain uniform steam pressure and using steam for atomization. An open-type feed-water heater is used—steam-driven pumps for boiler feed and for fuel oil. The control instruments on exhaust boxes, cookers, and retorts are actuated by air pressure, furnished by a compressor in the boiler room. Also, air pressure is required in the operation of retorts, as has just been described.

Because of the seasonal nature of our industry, plant operation periods are, in many instances, but a very minor portion of the year's cycle; a balance, therefore, must be struck between the operating saving, possible with an ideal installation having all the accessories that minimize actual operating costs, and the high first cost of such equipment with its annual overhead, interest, depreciation, and like charges.

Maintaining the Accuracy Of Control Equipment

By E. H. PYLE
General Superintendent's Office
California Packing Corporation

IN the large number of plants operated by the California Packing Corp., the investment in instruments is fairly large and they are scattered over a wide territory. Looking after them becomes a job that gives one man, and sometimes two men, plenty to do. We maintain our own instrument repair shop in San Francisco, where instruments are repaired, calibrated, tested, and a stock of spares is kept on hand.

We follow a well-defined procedure in maintaining the accuracy of our instruments. At the end of the canning season, instruments are removed from the machines and assembled at one point in the plant. Here they are inspected by one or both men from the instrument shop in San Francisco, who decide what must be done to put them into the best possible condition for the next season's operation. In some cases only minor repairs, replacements, or cleaning are required. With the majority of the instruments the job is attended to at once and the instruments are put away ready to be used the following year. If major repairs are required, the instruments are sent to the San Francisco repair shop.

During the operating season much the same procedure is followed. In the event of an instrument failure, the San Francisco shop is notified, and an instrument man visits the plant, taking with him a spare, which may or may not be used to replace the defective one in the plant. No persons in the plant are permitted to make any repairs or adjustments on instruments, except that pen arms may be adjusted to make them agree with the mercury indicating thermometers on the same machine. The instrument man carries with him on his visits certified thermometers (Bureau of Standards), a set of certified hydrometers, a pressure gage tester, some of the most commonly needed parts, a few tools for repairing instruments, and, of course, a spare instrument or two.

When instruments arrive in the San Francisco shop the tag shown in Fig. 1 is attached. They are next carefully examined, taken to pieces, each part examined and cleaned; worn, broken, or defective parts replaced, and finally reassembled. A list of the replacements is made on the back of the tag, so that the cost of the job may be estimated. If the enamel or paint is worn off, the instrument will be relacquered. In short, an effort is made to restore the instrument to the same mechanical perfection it possessed when new.

If tubing has been broken and replaced it will be necessary to replace the vapor or fluid first. This is done at a bench equipped with a mercury manometer, vacuum pump, and facilities for filling systems with either sulphur dioxide or ether. Calibration and testing then follow.

A temperature recorder is calibrated by first inserting the bulb in a bath of boiling water, simply to see whether or not the mechanism is "alive." If it is, the bulb may be left here for several minutes or an hour to see whether the pen will trace out a straight line with the bulb at constant temperature. If it does, the pen arm is adjusted to the proper temperature as shown by a calibrated indicating thermometer. Other points on the scale may be tested by immersing the bulb in an oil bath at a series of elevated temperatures. Because processing is controlled by the indications of two mercury thermometers, the recorder does not have to have the same degree of accuracy, but is most valuable to make a record of *changes* in temperature.

Fig. 1—One of these tags is filled out and attached to each instrument that is shipped to the San Francisco shop for repairs

Temperature controllers are tested by connecting them into the gas line to the burner which heats a

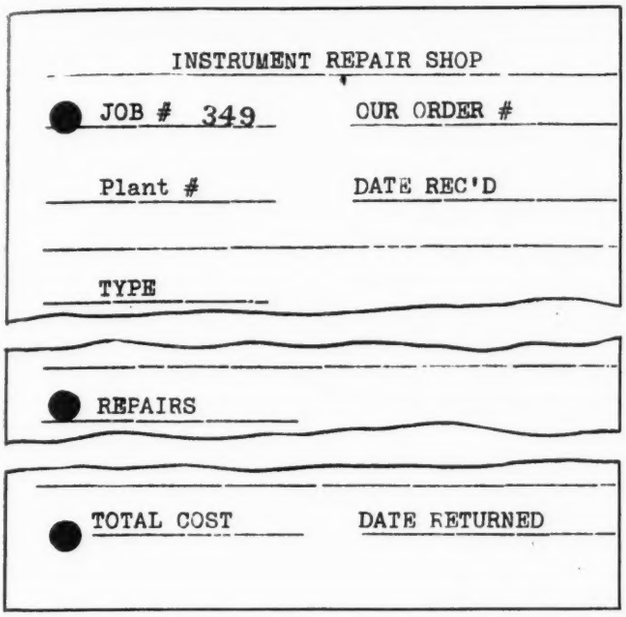


Fig. 2—In the instrument repair shop loose-leaf records of all the work that is done are kept on forms like this

small "retort." By means of a bypass, either direct or reverse acting types may be so tested. The top of the little retort has connections for a mercury thermometer, a temperature recorder bulb, and the thermostat bulb of the controller to be tested. All of these instruments have been previously tested and are part of the testing equipment of the shop. The recorder has a special dial that makes one revolution an hour, so that small fluctuations in temperature are much more noticeable than on the usual 12- or 24-hour dial, and show up as sharp breaks in the time-temperature curve. With this set up, the accuracy of control and efficiency of the controller is tested under operating conditions.

Indicating mercury thermometers are the basis of checking automatic control instruments. They are checked with certified thermometers every two or three months, and oftener if duplicate instruments on equipment do not agree. Thermometers with divided mercury columns are, of course, removed or taken out of service as soon as discovered. Repairing of glass parts of thermometers is such highly specialized work that we do not attempt it.

Pressure and vacuum gages also are repaired and tested in our shop. Pressure gages are tested by hydraulic pressure. Vacuum gages are tested by connecting them to a rotary laboratory vacuum pump in parallel with a mercury manometer.

New instruments also are tested, including new hydrometers and thermometers. Even though they are purchased on specification, they are tested by comparison with instruments certified by the Bureau of Standards.

Besides the testing and calibrating done in the San Francisco shop, which is mainly to see that no defective instruments are sent out to plants, the instruments are checked on the job in the plant. On retorts, accuracy is especially important, on account of legal requirements for time and temperature of cook.

Thermometers installed in duplicate on retorts and cookers are expected to agree within one degree. If there is a greater discrepancy, the superintendent of the plant is notified, and if the fault lies in the instrument itself the instrument repair shop gets a call. If the difference is not so pronounced that operating the equipment may be unsafe, the temperature indication of the lowest reading thermometer is used. If the difference makes the uncertainty too great, the line or piece of equipment may have to be stopped altogether.

In addition to the tag used to attach to repair work the information on it is copied on the loose-leaf record sheet shown in Fig. 2. This gives a record of the shop activities as well as the costs of repairing. When new instruments are purchased, a card is made out similar to that shown in Fig. 3. Specifications of recording and controlling instruments relating to size, type, range, and so on are entered on the back of the card. These cards give a history of each instrument in use and where it is located. They also are useful whenever instruments are sent in for repairs with no tag or when the tag has been lost, for by means of the serial number in the card file, full information may be obtained.

When it becomes necessary for a plant to have a new instrument the superintendent makes out a requisition for it which when received at the San Francisco office of the company is turned over to the instrument shop. If a thermometer, gage, or controller of the type needed is available, it is sent out to the plant. If not, a new instrument is purchased.

In addition to the control and salvage of instruments the instrument department has performed experimental work of value. For example, it was formerly the practice to attempt to control the temperature of a lye peeler for peaches by manual operation of a valve in the steam line. Peaches are not always fed to the peeler at an even rate, however; there may be short periods when no fruit at all is entering the peeler. The amount of steam that would keep the lye quietly boiling with a normal flow of peaches into the peeler will make it boil violently without them, giving the well-known foaming qualities of lye solutions a chance to develop, on account of the vigorous boiling. The solution then quickly boils over onto the floor and the peeling line must be stopped until a fresh batch of lye can be boiled up. At times in the past this has happened several times in a day. An automatic temperature controller permits only enough steam to be admitted at all times to keep the solution boiling, whether that "enough" is much or little.

Again, it has long been a general practice to operate open cookers by hand-operated valves. This succeeds fairly well if the operator watches closely and if the boiler pressure is fairly constant. With an automatic controller, however, no watching is necessary and the boiler pressure makes no difference. The saving in steam is worth going after.

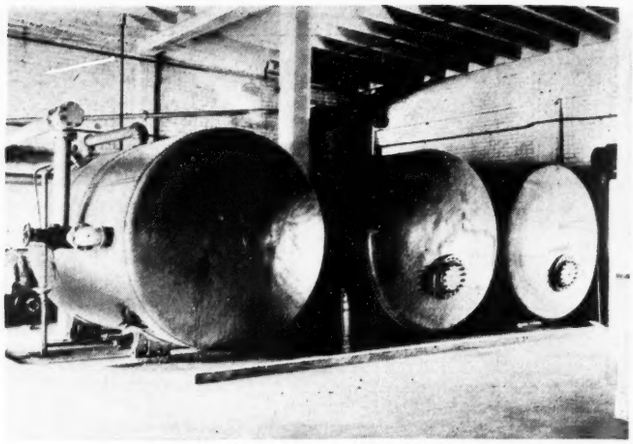
Fig. 3—File cards are kept for each instrument owned by the company, recording the history on the side shown, while data as to style and type are recorded on the other side

Controllers

Type _____ Plant No. _____

Date Rec'd.	Repairs Needed	Disposal	Date

Supplying Water To the Factory



Three sand filters, for removing suspended matter from well water, are surrounded by a curb which serves to keep any leakage from wetting operating floors

By J. W. SHUMATE
Assistant General Superintendent
California Packing Corporation

AN OUTSTANDING example of the almost prodigal use of water, so that its food products may be prepared in a clean and sanitary manner, is the fruit and vegetable canning plant. An ample water supply is one of the industry's fundamental needs. For washing raw material, making syrup and brine, blanching, peeling, for cleaning up, for cooling, for sanitary purposes, boiler feed, and fire protection, water takes its place with other raw materials in canning operations.

The quantity of water required naturally varies with the product being packed. Some products—spinach, for example—require enormous quantities; about one gallon of water to a pound of spinach, or around 60 gal. per case. Peaches also require much water, due to the fact that they are lye-peeled, and it is, of course, necessary to wash the peeled halves completely free from all traces of lye.

In our plants, where all water is purchased, and consequently metered, the records show that for all purposes and over the entire season the water used will amount to 75 to 100 gal. per case of goods packed.

Soft Water Necessary

The cannery has two principal requirements for water: first, it must be a good boiler water, and, second, it must be potable. The first requirement is necessary not only because the water is used in the boilers for generating steam but also because when placed in cans the water must be heated and in some products it must be heated under pressure in a retort. This condition requires that it be not too hard. Excessively hard water tends to make some vegetables—peas, for example—tough and hard, due to the combination of the magnesium and calcium salts in the water with substances in the vegetables. Neither must the water be too soft, particularly with sodium carbonate, for this is likely to cause hydrolysis of proteins at the pressure and temperatures used in the retort, and thus render the cans objectionable to smell and taste. Iron salts are objectionable and the presence of organic compounds that give color or odor, especially when heated, may cause a great deal of trouble.

Sand or other suspended matter that may find its way into the cans and lead to embarrassing complications must be avoided. This is particularly important in the case of pears, the extremely soft flesh of which makes sand or other gritty particles almost certain to adhere to them should the opportunity be offered.

The water supply for Plant No. 11, at Sacramento, comes from two sources: our own wells and the city water main. Reliance is placed mainly on our own wells at this plant, the city water being used for boiler feed only and for a standby in the event of pump failures.

Cost Favors Wells

The decision as to whether to drill wells or buy water depends entirely on the local water situation; on the cost of water if purchased and on the location of water-bearing strata below ground. The latter factor determines not only the likelihood of getting water should a well be drilled but also the cost of drilling the well and of pumping water from it. It has been our experience that where wells are practicable the cost of the water derived from them is about half as much as if it were purchased.

The cost of drilling depends on the depth and how the well is drilled. Of the two main wells at Plant No. 11, one is 500 ft. deep and cost about $8,500. The other is 800 ft. deep and cost only about $1,000. The shallower well was drilled with steel oil-well casing in about ten days. It was the second of the two and was put in as an emergency measure, for it appeared at the time that a water shortage was imminent. The 800-ft. well has ordinary stove-pipe well casing and took about two months to drill. Both wells furnish the same quantity of water—that is, 1,000 to 1,100 gal. per minute—and of about the same quality, although their depths are different. City water is somewhat less alkaline than the well water—which is the reason it is used for boiler feed—while the well water is used for all other purposes.

The two wells are located about a block apart, one at the east end and the other in the boiler room. They are pumped by direct-connected centrifugal deep-well pumps, motor driven. Both discharge through 8-in. pipes into sand filters and thence into the plant mains, the pumps themselves maintaining a pressure of 35 to 50 lb.—all that is required. No storage tank is used nor is one necessary, since there is no sprinker system in the plant. Filtration is the only treatment given to the well water at Plant No. 11. Quality is such that only mechanical impurities have to be removed.

Solving Personnel Problems In a Seasonal Industry

By RALPH E. SANBORN
General Superintendent
California Packing Corporation

TWO things stand out above all others in any discussion of cannery personnel problems. First, the seasonal nature of employment and, second, the large proportion of women and girls among the employees. Most of these factors affect the way a cannery organization is built up and maintained and the conditions of employment. Obviously, the entire working force cannot be kept throughout the year, yet some kind of a permanent crew must be kept to form the nucleus of a fresh organization when the plant starts. Obviously, too, it is wise to keep in this permanent crew those men and women who occupy key positions and are likely to have had a long cannery experience.

The organization in our plants is headed by a superintendent in charge. He may have an assistant, dependent somewhat on the size of the plant. Plant No. 11, our largest plant, has an assistant superintendent. This assistant acts somewhat as an executive officer who sees that the orders of the superintendent are carried out. Reporting to the superintendent or assistant are the foremen of the different departments: receiving department, preparation department, canning department, processing department or cook room, warehouse, and plant accounting department, which has the head bookkeeper in charge of it. In the preparation and canning departments, where women are employed, there are also forewomen who work with, and not for, the foreman in the same department. They, as well as the foremen, report to the superintendent direct.

Maintenance in Off-Season

These are the people who are kept busy throughout the year. The forewomen, however, are employed on the basis of a guaranteed amount of employment during the year at a definite salary. They may or may not be on hand when the plant is not operating. This crew during the off-season do maintenance and warehouse work. They are shifted from one to the other, depending upon the requirements. Maintenance work is strung out throughout the non-operating season so that the permanent crew, even though it is small, is able to handle it. This method may necessitate working from the close of a season until a few days before the next season begins.

The members of these crews are those from which future superintendent and managerial material is going to be drawn, and this winter maintenance work affords them a very thorough training in many details of plant equipment. A great deal of machinery, conveying systems, and other equipment must be completely dismantled, carefully inspected, cleaned, painted, repaired, and reassembled. A few seasons of this and a man's acquaintanceship with canning-factory equipment may justly be called complete.

It is upon the woman workers that the quality of the output depends. At no position where a man is employed can he affect quality very much unless it be by gross incompetency at his job, and in that case he will not be kept around very long. But upon the skill of the women cutters and canners depends the quality of the pack, and in no small degree the quantity of high-quality pack the factory can turn out per ton of fresh fruit received. Consequently, this group of workers must be selected with some care.

Building Up the Force

Our procedure is to keep a seasonal record of our women employees with their personal characteristics and the quality of their work and, sometime before the next season begins, to mail out notices to these giving the approximate date on which the factory will open. Those desiring employment come in and register. From the list of registrants, the superintendent and forewomen select those workers with whom they wish to open the season. Others are added as the season progresses until the entire working force is built up. Since the number of registrants may run into several hundreds, it is obvious that a good memory for names, faces, and working ability is a useful part of the superintendent's and particularly the forewoman's equipment for their jobs.

Experience either in our own plants or in other canning plants is desirable in woman employees. In a canning center such as Sacramento such workers usually are available, but workers move elsewhere or fail to return for one reason or another. Consequently, a certain number of beginners are taken on every year, depending on the requirements and, to a certain degree, on the supply of labor. Because we have certain ways of pitting peaches, peeling pears, and of preparing and canning other fruits that experience has shown give us the quality our trade expects, these beginners must be taught their work. Besides this, it is desirable that the beginner acquire speed in the work as rapidly as possible. This is for her own good as well as for ours, because the work is paid for on the piecework basis.

Teaching methods depend on the number of beginners to be taught. If there is a large number of them, they may be segregated to one or two tables and given special instructions as a group. If only a few, they are distributed among the regular workers and attention is given to them as needed by table forewomen. In both canning and preparation departments, each line of tables has a table forewoman who acts as teacher and inspector for her particular group of workers. Upon this table forewoman the work of teaching a new worker depends. In case a number of beginners are to be taught the table forewoman most apt at teaching is assigned to the work. During this period, beginners are paid by the hour or at the piecework rate, so that they may receive the greater

rate. Most of them quickly achieve piecework rates; those who do not, probably will never become efficient or desirable workers.

In spite of the seasonal nature of our operations the labor turnover at Plant No. 11, especially among women, is moderate. This is partly because most of our workers are permanent residents in Sacramento and have organized their activities to a seasonal occupation. They recognize that the cannery operates during eight or nine months of the year and expect to be employed at the cannery only during that period. Many of the same workers, particularly the best ones, come back year after year, so that an experienced organization in cannery work in general, and our own methods in particular, is quickly developed at the beginning of each season.

Workers Must Make Good Wages

No special effort is made to limit the employees to any race, nationality, or age. As a rule, the type of population in the city where the cannery is located determines the type of women employees. The requirements of the job take care of any discrepancies between physical or temperamental attainments and ability to do the job. For example, young women are most commonly the ones who do the canning. Canning is difficult to do rapidly, efficiently, or even comfortably sitting. However, seats are provided and are used, as desired, for short rests. This practice makes the work considerably more tiring and more of a physical drain than it otherwise would be; consequently, older women simply do not attempt canning, or if an attempt is made, they give it up and ask to be transferred to some other work. On the other hand, in the preparation department, where the work is slower and more deliberate, sitting is no bar to rapid and efficient work. The department is quieter, also drier as a rule, and it is here that we find most of the older women. However, workers of all ages are found in both departments; temperament and physical ability are more important factors than age. Naturally, there is no place for the woman who cannot do the work. We want workers who can make a good wage for themselves—as the majority of them do. By so doing they decrease our own cost of production. The state law requirements covering minimum wages for women and hours of labor regulate the lowest wage at which girls can be hired. However, women over 50 can get "slow worker" permits exempting them from the provisions of the minimum wage law.

All of our canneries maintain cafeterias. There are very good reasons for this. In the first place, there are times during the canning season when it is necessary to work long hours. If the working force is dismissed at let us say, 6 o'clock in the evening, asked to return at 7 o'clock and work after dinner, a certain proportion of them will return. A greater proportion will not, and the cannery finds itself limping along on about a half force. But, if a hot meal can be given in the plant at once without anyone having to go home and prepare it, there is far less objection to staying for the extra working period, and the morale is much better.

The flow of material through the house may require a lunch period at odd hours, like 11:30 a.m. or even 1 or 1:30 p.m., and perhaps only a half hour in length. These lunch hours at odd times and of odd length can be worked in if a cafeteria is available so that workers may quickly have a hot lunch and get back to their work. A cannery is frequently not convenient either to the worker's home or to eating places. Under such conditions the use of lunch periods at odd hours and of odd lengths would work an unnecessary hardship on employees and without doubt would react unfavorably both in quality and quantity of work.

Again, from the employees' standpoint it is not unusual to find the whole family—father, mother, and perhaps some of the children (over 16 years old)—working in the cannery. It is quite possible that their meal hours may not come at the same time. Even employees who bring their own cold lunches like to get a hot dish or coffee at times. All in all, a cafeteria in a plant smooths out a great many difficulties that otherwise would occur without it.

In some places—this is true of Plant No. 11—a day home for small children is maintained. Whether or not this is done depends on the location and type of woman employees. In some places many married women with children are employed, and in such cases we look after the youngsters, although, on account of certain legal restrictions, we do not take care of any under two years of age. In some cases we have found neighboring institutions, or day nurseries, with whom we are able to make arrangements to look after children of our employees.

Plant No. 11, as well as others, has a first-aid room with a registered nurse in charge. Arrangements also are made with a physician in the town in which the plant is located to look after emergency cases requiring a physician's care. A cannery is a fairly safe place to work. While there is no small amount of moving machinery, very few employees are concerned in its operation. Most of the workers work only with hand tools or without any tools whatsoever. Consequently, accidents are limited mainly to minor cuts and scratches.

Due to the seasonal nature of cannery work, organized campaigns for accident prevention are hardly possible. However, foremen and subforemen form a sort of ex-officio safety committee and are expected to keep a watchful eye on both employees and working conditions in their departments.

Welfare Under Executive Control

Each plant has a matron who looks after the women's rooms and acts as a liaison or personnel officer for the women in the plant. Besides this, there is an assistant general superintendent in charge of welfare on the general superintendent's staff of the corporation, who looks after the interests of all the women in the organization. Because she began as a worker in a cannery when a girl and has been closely connected with cannery work ever since, she is amply competent to do this work.

Hours of labor are rather indefinite. The state law fixes 8 hours as the working day for women in California, but exceptions can be made in the case of plants handling perishable food products. However, overtime must be paid after the 8-hour period. This is a requirement of the state law for women and minors only; it does not apply to men. It is, of course, impossible always to run a cannery 8 hours a day; however, we try to keep our working day down to a reasonable length. The efficiency of the workers falls off rapidly when the length of the working day is unduly extended. All the work done by women with the exception of forewomen and their assistants and beginners, is paid for on a piecework basis. Other workers are all paid on an hourly basis. Since men workers are employed mostly at individual jobs, a bonus scheme could hardly be made applicable with good results. Among women workers the adoption of piecework rates, at which each woman may make a high wage if proficient, has been the only incentive necessary.

Coordinating Field and Plant

By G. CHICK
Manager, Green Fruit Department
California Packing Corporation

THE perishable nature of much of the raw material of food processing, particularly in the canning industry, makes close coordination between field and plant vitally necessary. An organization of some kind is needed to go out into the growing fields and see to it that the plant receives raw material at the proper degree of maturity and in quantity which will neither overtax capacity nor fall beneath it to the extent that unit costs mount.

In the California Packing Corp., procuring of raw material is the function of the "green fruit" department, one of the units of the operating division. During the winter, when the factories are closed down, the sales department gathers information that forms the basis for an estimate of the quantity to be packed during the next season. When this estimate is approved by the management, it is passed on to the green fruit department for action.

Practically every fruit crop in California has a growers' marketing association. Some are quite powerful, others are less so, but all of them exercise a certain degree of control. There are also canners' organizations —the Canners' League of California and the Southern California Canners' Association—which include practically all the canners of the state. Both growers and canners gather information on the crop conditions and the state of the industry. Then, usually some time before the canning season opens, the growers' organizations announce a price that they will take for their product. This may or may not be accepted by the canners, but it at least offers a starting point for negotiations, and sooner or later a price is agreed upon. Usually the price thus agreed upon also becomes the price paid to nonmember growers of the same crop. The standard price eliminates bickering, as well as suspicion on the part of some growers that others have obtained more favorable treatment. Thus, so far as the green fruit department of the California Packing Corp. is concerned, there is little price making to be done.

For purposes of buying fruits and vegetables, we have divided the state into what we term buying districts, of which there are about twenty-eight. Each district has a head buyer and several assistant buyers, their number depending on the volume and kind of material to be purchased. The sizes of the districts are defined on a volume basis, rather than geographically, although, of course, the geography of the region and the location of the plants served are a factor. The assistant buyers in most cases are field men who regulate the supply of raw materials into the plant and supervise the quality.

In the matter of grower contracts, the Canners' League of California has worked out a uniform contract used by practically all canners, which contains, among other things, specifications as to the size and quality of the fruit. The quality of fruit delivered is determined by test gradings, carried out where delivery is made.

Sample boxes or crates are removed as the trucks drive up to the receiving platform, and are examined by a man experienced in fruit quality. The apparatus used consists of a canvas-bottom table about waist-high, on which the fruit can be rolled around and examined without injury; a pan, and a scale. Fruit not of the quality defined in the contract is removed and set aside. This is weighed, and if it does not exceed a reasonable amount, the load is accepted. If the quantity of defective or inferior fruit is excessive, the delivery must be re-sorted by the grower.

Normally two to four boxes of fruit are examined to each truckload. If the quality the grower has been delivering has been running uniform, only two boxes are examined, but if there is a variation in these, a third is examined as a check. Car lots are graded at the receiving station where the car is loaded. They are, however, checked when received at the plant.

In purchasing fruits and vegetables by contract on a quality basis, the question of flexibility of standards with crop conditions often arises. The canner is likely to feel that an inflexible standard of definite quality year in, year out, is best, but under present conditions it may be necessary to relax somewhat in years of shortage.

The next problem that the green fruit department

Gathering tomatoes. The "San Jose Canner" is the principal variety canned in California

Picking peaches at California Packing Corp.'s Fancher Ranch near Merced, Calif. There are about 4,000 acres of peaches and apricots on the ranch

faces is to get the purchased product into the factory in time and in proper quantity for efficient canning. It is not advisable to carry over fruit or vegetables from one day to another, and because of the responsibility of the canner in handling the tonnage purchased under contracts with growers, a problem arises in regulating supplies into the plant. Regulation is practiced whenever the capacity of the canneries seems likely to be overtaxed. It is common in the case of spinach, peas, or other highly perishable crops. Such crops as pears, however, present very little of a problem, since they are harvested before fully ripe and are brought more or less leisurely to the factory, where they are stored until ripe enough to can. But judgment must be exercised even on a crop like pears, to avoid an excessive supply at one plant at ripening time.

For all crops, the green fruit department ascertains as closely as possible the quantity of raw product that will be tendered for delivery each day, and distributes it among the different plants. The method of transportation of raw materials depends to a large extent on where they are grown with reference to the cannery where they are to be packed. Spinach, beets, carrots, and tomatoes arrive at Plant No. 11, for example, almost entirely by motor truck. Peaches and pears, on the other hand, come in largely by rail. Our central clearing agency in the San Francisco office directs the distribution of supplies into the plants. Field men, under the direction of the clearing agency, handle local details.

In conclusion, the advisability of the canner growing his own raw material should be mentioned. All told, the California Packing Corp. operates some 35,000 acres of ranches growing peaches, pears, apricots, asparagus, pineapple, peas, corn, and some other products.

The high-quality raw material we obtain from our own farming operations, where crops are grown on lands especially selected for the crop to be grown, under conditions best suited for the proper development, is of material assistance in maintaining high and uniform quality of finished canned products.

There are certain incidental advantages, too, which accrue to the industry as a whole by the introduction of the canner into the producing end of the industry. The capital which the canner usually has at his disposal makes possible considerable investigation of horticultural and agricultural practices on the ranches. This leads to advanced methods of fruit and vegetable culture that may later be adopted by the independent grower with consequent improvement in the quality of raw materials from all sources.

Spinach is cut off below the surface of the ground with a hoelike tool and gathered in spinach crates as shown below

NEWS OF THE MONTH

Congress, Pressed for Revenue, May Seek Tax on Soft Drinks, Not Beer

By Paul Wooton
Washington Correspondent

LEGALIZED beer, advocated as a revenue measure, is hardly expected to get very far at the next session of Congress, but the legislators appear likely to seek a tax on soft drinks as an equivalent source of revenue. This would be of serious consequence to an industry that can neither absorb the tax in the price of its products nor pass it on to the consumer without seriously curtailing its sales. Despite the difficulty in collecting such a levy, however, and the shrinkage in business resulting from the public's reluctance to pay it, it would be productive of considerable revenue. The idea that this industry has reaped the major benefits of prohibition renders it peculiarly susceptible when legislators are casting around to find means of raising money. A tax of 1c. per bottle on sales of carbonated beverages, alone estimated at 13 billion bottles, would amount to $130,000,000. This is equivalent to a 20 per cent tax on sales. A 10 per cent tax on bottled beverages, including both carbonated and cereal (15 per cent tax) drinks, produced a revenue for the federal government of $57,460,000 in 1920 and $58,675,000 in 1921. Since then the beverage industry has expanded greatly, with a production having a manufactured value of $257,000,000 in 1929. According to the latest census report, 5,000 odd firms whose operations exceed $5,000 a year employ 28,000 men and pay out $38,000,000 in salaries and wages. As the industry is composed in the main of small units operating locally, it is estimated that it actually employs some 250,000 persons whose wages approximate $250,000,000 a year.

Although the beverage industry has been singled out as the target of state taxation, this effort so far has been resisted successfully except in one state. The tendency among states in need of revenue to persecute this industry with taxation properly can be used as an argument against a federal levy. Bills to place a tax on beverages, which has been the bane of South Carolina bottlers for several years, were defeated in the last session of the legislatures of Alabama, Florida, Massachusetts, North Carolina, Oklahoma, Tennessee, Arkansas, Georgia, New York, Ohio, South Dakota, and West Virginia.

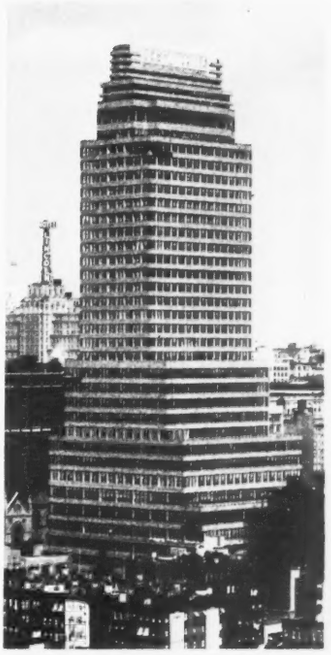
The profit to manufacturers in a bottle of carbonated beverage that retails at a "roof" price of 5c. is greatly overestimated. A survey of a group of representative plants made by the American Bottlers of Carbonated Beverages reveals an average profit of 4c. on a case of 24 half pint bottles of soda water that sells to the retailer for 80c. It is apparent that a tax of 1c. a bottle, or 24c. could not be absorbed by the manufacturer. The same is true for the retailer, whose expenses must come out of the gross profit of 40c. on a case that retails for $1.20. In its Louisville survey the Department of Commerce reported that although 12 of 26 retail grocery stores individually showed a net profit on beverages, there was a ratio of net loss to sales of 3.9 per cent for the group.

Food Topics Considered At Chemical Meeting

IN SEVERAL of the divisional meetings at the American Chemical Society convention at Buffalo, N. Y., Aug. 31 to Sept. 4, papers on food technology and research were of outstanding interest. In the division of agricultural and food chemistry, D. K. Tressler and W. T. Murray, of the General Seafoods Laboratory at Gloucester, Mass., described two devices for measuring tenderness of meats, one made from an ordinary tire air-pressure gage. Data obtained from their use revealed that, when beefsteak is quick-frozen and stored for one week, it is approximately 20 per cent more tender than before freezing.

The effect of bruising vegetables was analyzed in a paper by E. F. Kohman and N. H. Sanborn, of the National Canners' Association. Anaerobic respiration as a result of rupture of the cells, they pointed out, is a primary cause of development of "off flavors."

In a joint meeting of the food and biological divisions, a number of papers on vitamin studies were presented. The sugar chemistry group heard a discussion of thermophilic bacteria in sugar in a paper prepared by E. J. Cameron and W. D. Bigelow, of the National Canners' Association. Methods developed to supply sugar free from these organisms were the result of close collaboration between the canning and sugar industries, the authors stated.



New McGraw-Hill Building just prior to completion

Food Industries Moves To New Home

AFTER October, 1931, Food Industries and its companion publications will be located in the new McGraw-Hill Building, at 330 West 42d St., New York City. In the 33-story structure, the offices and printing plant of the McGraw-Hill Publishing Co., as well as the offices of the McGraw-Hill Book Co. and other subsidiaries, will be conveniently accessible to business associates and friends.

Externally, the building is an outstanding example of the modern trend in architecture, the largest building ever erected with color as an integral part of the exterior surface. Within, modern publishing facilities will help us to keep our journals up to date and in touch with our readers. An auditorium, seating 255, will be available for use by trade and technical associations and other groups.

We hope that our subscribers will visit us in our new quarters. The editorial offices of Food Industries will be on the 29th floor, with an excellent view of the heart of Manhattan. Visitors from out of town particularly, when making the inevitable sortie in the Times Square area, are urged to turn their steps westward for two blocks. The editors of Food Industries will welcome you.

Bakers at Chicago Discuss Merchandising Problems

MUCH of the discussion at the annual meeting of the American Bakers' Association, held Sept. 21 to 23, at Chicago, had to do with the falling scale of general prices and how best to adjust the baker's market thereto. Henry Stude, president of the association, in a witty address at the Monday afternoon session, reviewed the history of baking during the past ten years, tracing graphically its ups and downs and pointed out some lessons taught by depressions and booms.

A novel feature of the meeting was an exhibit of about one thousand loaves of bread, bought in all sections of the country, bearing labels showing weight, price, whether sold by grocer or chain store, and the section of the country where it was bought. Much of the time of the meetings was taken up with specific problems of merchandising, use of premiums, discounts, advertising methods, and the like. The attendance was larger than anticipated.

R. Adams Dutcher, head of the department of agricultural and biological chemistry at the Agricultural College of Pennsylvania, discussed food nutrition with particular reference to bakery products. He also pointed out the results that have been attained in the field of research of milk, ice cream and dairy products, in increased consumption of these products, and strongly commended similar methods of research to the baking industry.

Ross E. Anderson, president of the American Society of Bakery Engineers, discussed variety breads, giving concrete instances of sales of new kinds of bread and showing what proportion of the business thus begun was permanent, and how it was built up with no decrease in other lines.

The following were elected to the Board of Governors, to serve for a term of three years: R. R. Beamish, Davis Standard Bread Co., Los Angeles, Calif.; Alton B. Hastings, Jr., Hathaway Bakeries, Inc., Cambridge, Mass.; E. J. Hotchkiss, Spaulding Bakeries, Inc., Binghamton, N. Y.; A. H. Piper, H. Piper Co., Chicago; Harry W. Zinsmaster, Zinsmaster Baking Co., Minneapolis; L. J. Schumacher, American Cone & Pretzel Co., Philadelphia, Pa.; M. J. Freihofer, Wm. Freihofer Bakery, Philadelphia; Bryce B. Smith, General Baking Co., Kansas City, Mo.; Frank Mack, Mack Baking Co., Bangor, Me. Delegate-at-large T. F. Bayha, Wheeling, W. Va., was elected to fill the unexpired term of Glen Garber, deceased.

The executive and advisory committee meetings of the American Society of Bakery Engineers were held at Chicago Sept. 20, at the Sherman Hotel. The meetings were presided over by President Ross C. Anderson, Western Bakeries Corp., Los Angeles. Tentative arrangements for the next meeting, to be held in Chicago in March, 1932, were discussed. Plans were also made for the Junior National Convention to be held in Los Angeles in June, 1932.

COMING EVENTS

OCTOBER

5-9—National Restaurant Association (with exhibit) Broadway Auditorium, Buffalo, N. Y.
10-18—National Dairy Exposition, St. Louis, Mo.
12-16—National Safety Council, Stevens Hotel, Chicago, Ill.
16-21—Institute of American Meat Packers, Waldorf - Astoria Hotel, New York City.
19-21—American Dietetic Association, Hotel Gibson, Cincinnati, Ohio.
26-28—Mayonnaise Manufacturers Association, Hotel Stevens, Chicago, Ill.
26-31—Dairy Industries Exposition, Dairy and Ice Cream Machinery and Supplies Association, Municipal Auditorium, Atlantic City, N. J. (Oct. 26-28—International Association of Ice Cream Manufacturers, Ambassador Hotel; Oct. 29-31—International Association of Milk Dealers, Chalfonte-Haddon Hall Hotel.)

NOVEMBER

7-14—Pacific Slope Dairy Show, Oakland, Calif.
9-13—American Bottlers of Carbonated Beverages, Dallas, Texas. (Sessions at Dallas Municipal Auditorium.)
10-13—National Association of Practical Refrigeration Engineers, Rice Hotel, Houston, Texas.
17-20—National Association of Ice Industries, Gunter Hotel, San Antonio, Texas.

Mapes Law Includes Preserves, Solicitor Holds

AUTHORITY for the U. S. Secretary of Agriculture to establish standards for jams, jellies, and preserves under the McNary-Mapes amendment to the federal food law has been upheld by the solicitor of the department. He has ruled that these products are "canned foods," as defined in the amendment, and that the Secretary of Agriculture can require preserves below a specified standard, if not adulterated or misbranded, to bear the "Below U. S. Standard—Low Quality But Not Illegal" legend.

Preserves in which pectin, sugar, and water have been partially substituted for the normal quantity of fruit, however, are not to be considered as substandard products, the solicitor has indicated. Such products are considered adulterated or misbranded, under the general terms of the food law, unless sold under a label clearly differentiating them from preserves.

The rulings were obtained as a result of efforts by the National Preservers' Association to find a legal method of lessening the price competition on high-quality preserves from low-quality and imitation products. A brief pointing out that preserves were included in the "canned food" definition of the Mapes Act was filed by Daniel R. Forbes, counsel for the association, last March.

It seems probable that some action urging the Secretary of Agriculture to formulate standards for jams, jellies, and preserves under the terms of the Act will be taken by the association soon as a result of the decision.

Cross-Country Truck Test a Success

THE view that transcontinental truck shipments are economically feasible has been confirmed by the recent test run from Los Angeles to New York, according to Col. E. M. Davis, of California Freight Lines, Inc., who was in charge of the experiment. Establishment of a regular service scheduled to cross the country in less than seven days is a logical possibility, he pointed out.

The test run, covering 3,200 miles in a running time of 117 hours, was carried out in cooperation with the General Motors Truck Co. A number of perishable food products transported in a refrigerated compartment of about 600 cu.ft. made up a portion of the 20-ton load. Unvarying temperatures of 35-36 deg F. were maintained within the compartment, although atmospheric temperatures encountered were as high as 130 deg. Eggs, new crop oranges, ripe olives, dates, and figs were among the products in the refrigerated space. For the experiment, the truck was equipped with a test compartment in which the motor, bearing, and interior temperatures were recorded throughout the trip. Due to public interest in the vehicle, a number of stop overs brought the elapsed time for the trip to twelve days, but these would be eliminated in regular service.

The gross load of truck and trailer was 60,000 lb., borne on a total of 22 tires. Gasoline consumption for the trip totaled 1,145 gal., or about 2.75 miles per gal. Total oil consumption was but 13 qt.

What Six-Cent Cotton Will Mean to You

What has the price of cotton to do with the food industries? Plenty!

For years the South has failed to feed itself; it has been a good customer for foods from other sections of the country. The economic error of agricultural dependence upon a single cash crop has been well known to southern leaders, but up to now they have been unable to make southern agriculture see its mistake. Six-cent cotton will do it with a vengeance!

When cotton sells below its production cost, the South cannot purchase its food. But the southern farmer will not starve—he will begin to raise it himself. What, then, will become of this market for manufactured foods as the switch is made from specialized to subsistence agriculture? Will the established food industries be left high and dry with additional idle capacity? If the South is forced to produce raw materials for food manufacture in order to live at all, is there an opportunity to help them, or to help ourselves?

A summary of this situation will appear in the November issue.—The Editors.

Canning Packs Show Drop For Several Products

A PACK of ten million cases of tomatoes can be anticipated this year on the basis of the Sept. 24 Bureau of Agricultural Economics crop report. This would indicate that the canning crop would be 41 per cent under last year, when the pack totaled 17 million cases. Other well-informed sources are said to regard eight million cases as more probable. The size of the crop has shrunk steadily throughout the season and unusually hot weather in September, following the heavy rains in the latter half of August, has brought estimated production down to 1,066,900 tons from 1,815,500 tons in 1930.

The carry-over from last year's huge pack may be sufficient to meet the demand, but it is reported in the trade that most of this has moved out on low prices. The extent to which the pack of tomato juice may cut into the canning supply also is a doubtful factor, in the light of the tremendous increase in the production of this product last year.

Pea Production Down

Questionnaires returned to the Bureau of Foreign and Domestic Commerce by canners of peas representing over 96.7 per cent of the United States pack revealed a decrease of almost nine million cases from last year's figure. Total production, including estimates for canners not included in the questionnaire returns, is given at 13,285,826 cases (24 No. 2 can basis). Production by states and by size of containers is as follows:

	1930	1931
Wisconsin	10,491,727	5,057,433
New York	3,164,083	1,786,144
Maryland	339,918	1,242,947
Illinois	1,560,253	1,002,836
Indiana	564,070	710,774
Utah	1,662,445	675,873
Minnesota	1,333,074	617,008
Michigan	880,130	433,839
Ohio	208,009	398,256
Delaware and New Jersey	73,719	297,672
Pennsylvania	97,291	158,264
All other states	1,600,493	904,870
Total	22,035,212	13,285,826

By Sizes of Containers, 1931

Size	Cases
48—No. 1's	777,340
24—No. 2's	10,938,899
6—No. 10's	941,244
48—No. 55's	96,084
Other sizes	218,900

The pack of California cling peaches has been put at 8,350,000 cases by the latest estimate of the Control Group. This is 650,000 cases below the agreed limit, and is generally considered as highly favorable. Although there is a considerable holdover from last year's pack of 12,635,830 cases, it is believed that the total will not be above the consuming capacity of the country.

Salmon Pack May Equal 1930

Although less gear and fewer plants are in operation, the pack of Alaska salmon this year may equal the 5,032,326 cases packed last year, the Bureau of Fisheries reports. Improvement in runs as a result of regulatory action has brought the pack above early expectations, it was pointed out. The salmon pack in British Columbia for the period ended Aug. 29 is far lower than last year, amounting to 556,470 cases, compared to 1,579,899 cases in the same period in 1930.

Estimates of the Japanese and Russian pack of canned crab meat put the total pack for this year some 224,000 cases less than last.

Frozen Foods Association Hears of Georgia Study

WORK at the Georgia Experiment Station on various problems in the processing and distribution of frozen foods was described at the meeting of the Frozen Foods Association of America held on Sept. 24 at Experiment, Ga. About 150 delegates attended, and although most of these were residents of the Southeast, representatives of Northern interests were also in attendance.

Among the most interesting papers was one by K. T. Holly, chief chemist at the Experiment Station, who discussed technical problems of freezing and the chemical changes that accompany freezing and storage. The fact that the public does not consider these products chiefly as a novelty was stressed by John K. Davenport, of the Davison-Paxton Co., Atlanta, Ga., who pointed out that about 90 per cent of the business is now from repeat customers.

Economic possibilities inherent in freezing culls and off-grade surplus were mentioned by W. T. Comer, of the Crystal Carbonic Co. Although the idea appeared rather radical to those who have urged that only products of the highest quality be frozen, Mr. Comer contended that quality of the products would be improved by the treatment.

The influence of freezing on cell structure of fruit was considered, particularly from the theoretical angle, by J. G. Woodruff, of the Experiment Station. Other speakers included W. R. Tucker, of Ice Bound Products, Inc.; Ralph V. Grayson, of Polar Products, Inc.; and Dr. Leah Aschem, home economist of the Experiment Station.

Unsettled Conditions Affect Food Group

Continued improvement in the food industries has been halted by generally unsettled conditions. Although wholesale and retail food prices did continue to reach for higher levels for the month ending Aug. 15, a weighted price index indicates a gradual decline in these prices since Sept. 1. Between July 15 and Aug. 15, wholesale food prices increased 0.83 per cent, in comparison with 0.29 per cent increase in general average price of all commodities.

Average retail prices in 51 cities increased 0.59 per cent, in comparison with a rise of 0.7 per cent the previous month. A weighted price index gives a decrease of 0.32 per cent for the first three weeks in September.

Employment totals in the food group showed no change in the 30-day period ending Aug. 15, as compared with a decrease of 0.57 per cent in all manufacturing groups. Payroll totals declined 1.63 per cent, as against 1.02 per cent decrease for all manufacturing groups. Seasonal activities brightened the picture for the confectionery and canning industries. Slaughtering, meat packing, ice cream, flour milling, baking, and cane sugar refining divisions showed decreases. Canning employment increased 39.8 per cent; confectionery gained 7.0 per cent in employment and 12.21 per cent in payroll averages. During the month of October, the sugar beet division is to enter a seasonal activity that will raise its employment and payroll averages.

A retail organization with national distribution reports an increase of 7.02 per cent in tonnage sales for the month ending Aug. 29, with a decrease of 5.05 per cent in volume of dollar sales.

General business conditions, as represented by *The Business Week* index, dropped from 73.8 per cent of normal to 72.2 per cent during the month ending Sept. 26.

NEW CONSTRUCTION

Bakery—J. Boruta, 103 Halstead St., Wallington, N. J., postponed construction of a 2 story, 75 x 75 ft. bakery, stores and garage at Wallington Ave. and Mercer St. Estimated cost $40,000. J. T. Camlet, 26 Piaget Ave., Clifton, Archt. Maturity indefinite.

Bakery—Dorothy Muriel's Food Shops, 1368 Beacon St., Brookline, Mass., awarded contract for a 1 and 2 story bakery and garage on Everett St., Brighton to Scott McNeilly, 35 Webster St., Brookline. Estimated cost $40,000.

Bakery—P. Odierno, 112 Porter St., East Boston, Mass., plans completed for addition and alterations to bakery. Estimated cost $40,000. M. J. Mastrangelo, 40 Court St., Boston, is architect.

Bakery—Trausch Baking Co., 1120-1154 Iowa St., Dubuque, Ia., awarded contract for a 1 story bakery at Main and Jones Sts. to Anton Zwack, 1301 Central St., Dubuque. Estimated cost $60,000. Also plans remodeling two buildings now on site.

Bakery Addition—Barkers Bread Ltd., 230 Walmer Road, Toronto, Ont., is having plans prepared for a 3 story addition to bakery. Estimated cost $75,000. Chapman & Oxley, Sterling Tower, Toronto, are architects.

Bakery Addition—Helms Bakeries Ltd., 8800 Venice Blvd., Los Angeles, Calif., has work under way for a 1 story addition to bakery. Estimated cost $30,000. Contract awarded to Grant & Bruner Ltd., 607 Ferguson Bldg., Los Angeles.

Baking Ovens—Fehr Baking Co., 4104 Lecland St., Beaumont, Tex., plans the installation of baking ovens in connection with proposed improvements to bakery. Estimated cost $40,000. Private plans.

Food Products Plant—National Biscuit Co., 129 Franklin St., Cambridge, Mass., awarded contract for addition and alterations to plant to H. L. Hayser Building Co., 31 Bay St., Dorchester. Estimated cost $40,000.

Bottling Plant—Coca Cola Bottling Co., 560 Edgewood Ave. N. E., Jamestown, N. Y., or c/o Coca Cola Co., 310 North Ave., N. W., Atlanta, Ga., plans the construction of a bottling plant. Estimated cost $45,000.

Canning Plant—White House Milk Co., H. M. Clark, Mgr., South 21st St., Manitowoc, Wis., plans construction of a canning plant. Estimated cost $200,000. Architect not selected.

Creamery and Dairy Plant—Leopold Vilsack Estate, 424 North Highland Ave., Pittsburgh, Pa., awarded contract for a 2 story, 50 x 100 ft. creamery and dairy plant; also 1 story, 35 x 100 ft. garage at 6465 Hamilton Ave. to J. A. Romano, 1453 Barnesdale St., Pittsburgh. Estimated cost $60,000. Highland Dairy Co., 5135 Penn Ave., Pittsburgh, is lessee.

Dairy Plant—Cornwall Eastside Dairy Co., Cornwall, Ont., plans the construction of a dairy plant. Equipment will be required.

Dairy Plant—Decatur Milk Association, A. McIntosh, Secy., Decatur, Ill., plans the construction of a 1 story dairy plant including equipment on Main St. Estimated cost $40,000. Private plans.

Dairy Plant—Valley Dairy Co., 548 Colyton St., c/o T. R. Cooper & Co., Western Pacific Bldg., Los Angeles, Calif., Contrs., will build a 2 story, 65 x 200 ft. dairy plant on Fletcher Ave. $65,000.

Dairy Products Plant—National Dairy Products Co., Franklin Division, 66 Washington St., Somerville, Mass., awarded contract for a 3 story, 62 x 125 ft. plant to John W. Duff Inc., 146 Summer St., Boston. Estimated cost $200,000.

Dairy Building — Dept. of Mental Hygiene, Capitol, Albany, N. Y., will receive bids until Oct. 14, for the construction of farm barns, dairy building and farm colony dormitory at Letchworth Village, Thiells.

Ice Cream Plant—Anheuser Busch, Inc., 979 Brook Ave., New York, N. Y., plans addition and alterations to ice cream manufacturing plant and garage at 104th St. and Atlantic and 94th Aves., Richmond Hill. Estimated cost $40,000. J. E. Ross, 23 West 43rd St., New York, is architect.

Ice Cream Plant — Reid Ice Cream Co., Waverly and Atlantic Aves., Brooklyn, N. Y., awarded contract for alterations to plant to Equity Construction Co., 25 West 43rd St., New York. Estimated cost $105,000.

Milk Products Plant—United Milk Products Co., J. Harris, Mgr., Elkhorn, Wis., is having plans prepared for the construction of a 1 story waste treating plant at Johnson Creek. J. Donohue Engineering Co., Sheboygan, is engineer.

Butter Plant and Refrigeration Warehouse—Central Manufacturing District, 38 South Dearborn St., Chicago, Ill., will build a butter plant and refrigeration warehouse. Estimated cost to exceed $40,000. Work will be done by separate contracts. The Great Atlantic & Pacific Tea Co., 420 Lexington Ave., New York, N. Y., lessee will transfer equipment from present plant to new building.

Cold Storage Warehouse—Atlas Cold Storage Warehouse Co., c/o E. R. Fisher, Pres., Green Bay, Wis., is receiving bids for a cold storage warehouse. Estimated cost $40,000. Private plans.

Cold Storage Warehouse—M. C. Cohadas, 812A Bound St., Appleton, Wis., is having plans prepared for a 2 story, 46 x 100 ft. cold storage plant and warehouse at Oshkosh. Estimated cost $40,000. D. E. Anderson, Marquette, Mich., is architect.

Ice and Cold Storage Plant—Community Ice & Produce Co., Sulphur Springs, Tex., is having preliminary plans prepared for the construction of a 25-ton ice and cold storage plant at Sapulpa, also at McAlester, Okla. Estimated cost $50,000 each.

Ice Manufacturing Plant—Central California Ice Co., 702 P St., Fresno, Calif., will soon award contract for the construction of an ice manufacturing plant and office building at South K and Sonora Sts., Tulare. Estimated cost $45,000. New machinery and equipment will be installed.

Ice Manufacturing Plant—St. Francis Ice Co., represented by C. S. Plaut, 1012 California St., San Francisco, Calif., plans to expend $100,000 in reconstruction and installation of equipment at 10th and Bryant Sts. Estimated cost $100,000. Architect not determined.

Ice Manufacturing Plant—Tulare Ice Co., M. and Pine Sts., Tulare, Calif., plans the construction of an ice manufacturing plant at Exeter. Estimated cost $45,000.

Ice Manufacturing Plant—Union Ice. Co., 354 Pine St., San Francisco, Calif., awarded contract for a 1 story ice manufacturing plant to Taylor & Goericke, Sharon Bldg., San Francisco. Estimated cost $15,000 exclusive of equipment.

Ice Plant—H. C. Badger and Alex Davidson, c/o Herring Hotel, Amarillo, Tex., will build a 1 story, 45 x 70 ft. ice plant. Estimated cost $50,000. H. M. Warren, 1012 Pierce St., Amarillo, is engineer. Work will be done by owners' forces.

Ice Plant—R. E. Ewing, Santa Rosa, Tex., awarded contract for a 1 story ice plant at Edcouch to C. C. Daniels, Santa Rosa. Estimated cost $80,000.

Ice Plant—Owner, c/o Christian Ziegler, 26 Journal Sq., Jersey City, N. J., Archt., is having plans prepared for a 1 story ice plant. Estimated cost $40,000.

Plant—Carbon Dioxide & Chemical Co., c/o W. C. Cavenaugh, Woodside, Utah, is having preliminary plans prepared for addition to dry ice plant. Estimated cost $100,000.

Cheese Factory—Kraft-Phoenix Cheese Corp., W. Baird, Supt. of Const., Beaver Dam, Wis., awarded contract for a 3 story factory to Huttle Construction Co., 128 Western Ave., Fond du Lac. Estimated cost $40,000.

Gelatin Factory—Atlantic Gelatin Co. Inc., J. H. Cohen, Hill St., Woburn, Mass., awarded contract for two 1 story, 30 x 145 ft. manufacturing buildings to L. Leroy Fox Inc., 101 Milk St., Boston. Estimated cost $50,000.

Grocery Warehouse—Santa Fe Improvement Co., Topeka, Kan., awarded contract for the construction of a wholesale grocery warehouse to Austin Co., 16112 Euclid Ave., Cleveland, O. Estimated cost $200,000.

Grocery Warehouse—Epple & Kahrs, 15 Washington St., Newark, N. J., Archts., plan the construction of a 5 story grocery warehouse and office for Wilkinson Gaddis & Co., 95 Parkhurst St., Newark. Estimated cost $500,000.

Grocery Warehouse and Distribution Plant—The Great Atlantic & Pacific Tea Co., 420 Lexington Ave., New York, N. Y., awarded contract for a 125 x 300 ft. warehouse, distribution plant and cold storage plant, etc. at Hawthorne, N. J. to Austin Co., 120 Broadway, New York. Estimated cost $250,000.

Produce Warehouse—Detroit Union Produce Terminal Co., West Fort St., Detroit, Mich., awarded contract for a 2 story, 110 x 400 ft. warehouse on Springwells Ave. to Bryant & Detwiler Co., 2806 Union Guaranty Bldg., Detroit. Estimated cost $170,000.

Cereal Factory—Campbell Foods Ltd., Ontario, Calif., is having tentative studies made for the construction of a new 3 story factory for the manufacture of cereals. $100,000. Machinery and equipment to cost $65,000 will be installed. Plans completed for remodeling building on South Sultana Ave. $35,000.

Cereal Package Foods Plant—General Mills, Inc., 200 Chamber of Commerce Bldg., Minneapolis, Minn., plans addition to cereal package foods plant and packaging equipment at South Chicago, Ill. Estimated cost to exceed $100,000.

Feed Mill—B. A. Peek, 914 East Fillmore St. and J. F. Plangman, 5723 Vanderbilt St., Dallas, Tex., will soon award contract for the construction of a 2 story, 30 x 60 ft. dry feed mill including equipment at Harlingen. Private plans.

Grain Elevator — Albany Port District Commission, P. G. Ten Eyck, Chn., 74 Chapel St., Albany, N. Y., will soon award contract for the construction of a grain elevator, 2,000,000 bu. capacity. Estimated cost $1,500,000. Arnold G. Chapman, is chief engineer.

Grain Elevator — Cereal Products Co., 605 Washington St., Manitowoc, Wis., awarded contract for the construction of a grain elevator, 500,000 bu. capacity to McKenzie-Hauge Co., Corn Exchange Bldg., Minneapolis, Minn.

Grain Elevator—Diamond Mill & Elevator Co., Fort Worth, Tex., awarded contract for addition to grain elevator, 400,000 bu. capacity at Sherman to Jones-Hettelsater Construction Co., 600 Mutual Bldg., Kansas City, Mo.

Grain Elevator—Emporia Elevator & Feeding Co., Emporia, Kan., has work under way on the construction of a 26 x 30 ft. grain elevator, 15,000 bu. capacity. Contract awarded to Federal Engineering Co., 216 West 6th St., Topeka. H. Smith, Emporia, is lessee.

Grain Shed—California State Harbor Commission, Ferry Bldg., San Francisco, Calif., is having plans prepared for a 100 ft. extension to grain shed, including additional bins, etc., at Islais Creek Terminal. Estimated cost $60,000. F. G. White, Ferry Bldg., San Francisco, is engineer.

Grain Storage Bin—Bowersock Milling Co., Lawrence, Kan., has work under way on the construction of a 100,000 bu. grain storage bin. Work under the supervision of owners.

Fruit Terminal—Norfolk & Western Railway, Roanoke, Va., plans the construction of a fruit terminal on Water St., Norfolk. W. P. Wiltsee, Roanoke, is chief engineer.

Citrus By-Products Laboratory — Bureau of Chemistry & Soils, Washington, D. C., plans establishing a citrus by-products laboratory at Mercedes, Tex. Private plans.

Packing Plant Addition—Calavo Growers Inc., Everett Ave., Los Angeles, Calif., awarded contract for a 50 x 75 ft. addition to packing plant to William Neil Co. Ltd., 4814 Loma Vista St., Los Angeles.

Packing Plant (Citrus Fruit)—Lake Wales Citrus Growers Association, Lake Wales, Fla., awarded contract for a citrus fruit packing plant to G. A. Miller, 312 Twiggs St., Tampa. Estimated cost $150,000.

Packing Plant (Citrus) — Texas Citrus Growers, Exchange, Mission, Tex., received lowest bid for the construction of a 1 story, 96 x 126 ft. packing plant at First and Adams Sts., Harlingen, from W. A. Velton, Brownesville, $32,500.

Packing Plant—Albert Packing Co., G. Albert, Cecil, Pa., plans the construction of a packing plant at Washington. Estimated cost $40,000. Architect not selected.

Packing Plant Addition — Harman Packing Co., 3401 East Vernon St., Los Angeles, Calif., plans a 32 x 52 ft. addition to packing plant.

Packing Plant—Hilgemeier Bros., 519 West Raymond St., Indianapolis, Ind., awarded contract for a 3 story, 22 x 91 ft. packing plant to William P. Jungelaus & Co., 825 Massachusetts Ave., Indianapolis. Estimated cost $40,000.

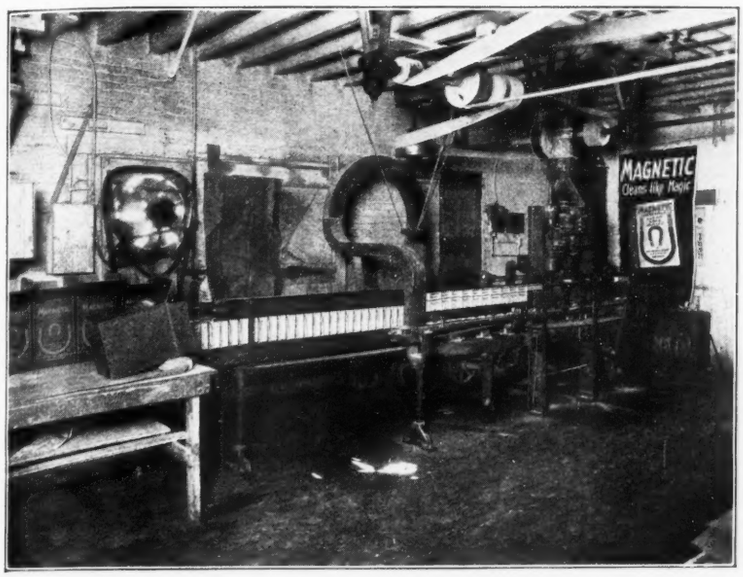
Packing Plant—Armour & Co., 316 South La Salle St., Chicago, Ill., will soon receive bids for alterations to packing plant including boiler and stoker units at Fargo, N. D. Estimated cost to exceed $40,000.

Warehouse—Swift & Co., 60 North Market St., Boston, Mass. (wholesale meats), will soon award contract for a 2 story, 100 x 200 ft. warehouse at Wilkes-Barre, Pa. Private plans.

Packing Plant (Poultry)—Valley Box & Crate Co., c/o R. T. San Benito, Tex., awarded contract for a 1 story, 53 x 88 ft. poultry packing and shipping building at San Juan to O. T. Wallace, San Juan. South Texas Produce Co., is lessee.

Sausage Factory—Correia & Sons, 18 Puritan St. S., Dartmouth, Mass., awarded contract for a 2 story sausage factory to Napoleon St. Pierre, 10 King St., New Bedford, Mass. Estimated cost $40,000.

Fish Hatchery — Union Electric Light & Power Co., 12th and Locust Blvds., St. Louis, Mo., is having preliminary plans prepared for a fish hatchery to stock Lake of Ozarks formed by water backed up by hydro-electric dam on Osage River near Bagnell. $40,000 to $50,000. Missouri State Game & Fish Department, J. Ross, Comr., Jefferson City, will supervise.



A Packomatic Carton Sealer and Filling Machine packs Magnetic Crystals at a speed of (60) per minute for The Lavo Company of America, Milwaukee, Wisconsin.

check and DOUBLE *check* THESE FACTS

The outstanding fact about Packomatic Machinery, is that it's known in more than 2,000 manufacturing plants as money saving equipment.

As never before, Packomatic Machinery is being used throughout the industries who have packaging problems to meet. And it is helping them whip these production problems, saving hand labor, floor space, and producing more uniform packages.

Packomatic Machinery is a doer of the old work in a new way. A convenience? You bet! But primarily it's a money saver.

Let one of our Engineers show you Packomatic economy, and how it will affect a great saving in your plant. This information will cost you nothing but your time. Phone us—Wire us—Write us. Our Engineer will meet you any time, any place.

WRITE FOR NEW CATALOG

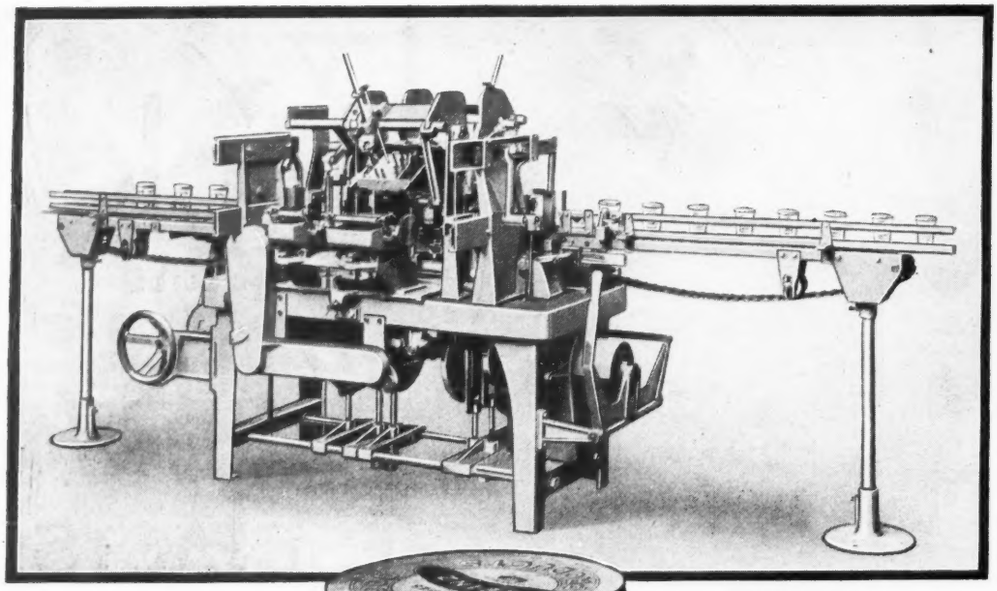
A FEW PACKOMATIC USERS

The Quaker Oats Company,
Canada Dry Ginger Ale, Inc.,
George A. Hormel, Company,
Lavoris Chemical Company,
Maxwell House Products Company,
Ohio Salt Company,
Thomas J. Webb Company,
Procter & Gamble Company,
The Sanitary Grocery Company,
The Carnation Company,
The Postum Company,
The Cream of Wheat Corporation,
The Pepsodent Company,
National Biscuit Company,
The Diamond Crystal Company,
The Kellogg Company,
Great A. & P. Tea Company
Cream of Wheat Company.

PACKOMATIC
PACKAGING MACHINERY

J. L. FERGUSON COMPANY, JOLIET, ILLINOIS

Branch Offices: NEW YORK ST. LOUIS LOS ANGELES



Another World labeling success»
Heinz Peanut Butter
made by
H. J. Heinz Company
Pittsburgh, Pa.

Heavy fluted tapered, jars, two labels at one operation.

WORLD Automatic Straightaway Labeler is made in two types» for face labeling and double labeling at one operation.

This fully automatic machine is proving its worth, labeling flat, round, oval or panel bottles and jars and other packages in various sizes.

Let us show you how this outstanding machine can increase your profits.

ECONOMIC MACHINERY COMPANY

Largest Manufacturers of Labeling Machines in the World

WORCESTER, MASS., U. S. A.

WORLD LABELERS

Modern and efficient plant of National Grocery Company, Seattle. Austin design, engineering and construction.

Why Handicap Management with a "White Elephant"?

In Yakima, the Bronx and at other points on the map, Austin has helped shrewd management get out of old "White Elephant" plants and get into modern plants geared to new cost-reducing methods of operation. These plants are designed to function like mammoth machines with efficient layouts, balanced departments and straight-line production methods which provide new speed, smooth running operation and worthwhile savings.

In such plants these results must necessarily be influenced by the following considerations: clear spans with maximum unobstructed floor areas, all provided with fresh clean air and good daylighting. Of no less importance is an adequate and proper steam plant, process piping, power wiring, water supply, refrigeration, proper storage and shipping facilities.

It is a generally recognized fact that "Good Engineering is worth many times its cost."

Austin's intimate experience in your industry will contribute added "Dollar & Cents" advantages. Austin's plan of Undivided Responsibility provides for a complete service. Layout, designing, construction and equipment engineers develop your plant from start to finish under one contract . . . turning over to you in record time a complete plant ready for production.

If you've checked and double-checked every *other* part of your business, why hesitate to consult with a capable outside organization to learn how the *plant itself* can contribute to profits? In these times no one can afford to overlook *any* opportunity. Why not grant Austin a brief interview which may bring you ideas that will have an important bearing on your business NOW and for years to come? Phone, wire, write or use the Memo below.

THE AUSTIN COMPANY

Engineers and Builders - - - Cleveland

NEW YORK CHICAGO DETROIT NEWARK
PHILADELPHIA CINCINNATI PITTSBURGH
BOSTON ST. LOUIS SEATTLE PORTLAND
CLEVELAND

THE AUSTIN METHOD

THE AUSTIN COMPANY OF TEXAS: DALLAS
THE AUSTIN COMPANY OF CALIFORNIA, LTD.: LOS ANGELES OAKLAND AND SAN FRANCISCO
THE AUSTIN COMPANY, LIMITED, TORONTO

Memo to The Austin Company, Cleveland

☐ Our Door is Open to New Ideas! ☐ We are interested in a ..... project of approximately ..... sq.ft.

Location ..... Individual ..... Firm ..... City ..... F.I. 10-31

Inside and Out HOFFMAN

Bright, white tiled walls topped with the world's largest steel bottle make the Hoffman Beverage Company's plant at Newark, N. J., a landmark for miles around. Inside, these distinctive buildings are painted for immaculate cleanliness with Barreled Sunlight.

"INSIDE, outside, the great plant of Hoffman is as bright and crystal-clean as sunlight," so reads a recent Hoffman Beverage Company advertisement.

Exteriors . . . gleaming tile; always white; easy to keep clean. Interiors . . . gleaming white; spotlessly clean—for ceilings and walls are painted with Barreled Sunlight . . . the paint enamel that remains white longest . . . washes like tile.

• • •

NOT at all common, this use of tile for exteriors. But literally hundreds of establishments, both in the food and the general industrial fields, employ Barreled Sunlight for interior painting.

The list of famous users is long, but the reasons for their preference may be stated briefly: They have found that Barreled Sunlight best meets the four major requirements of a successful industrial paint . . . whiteness, light reflection, cleanliness and economy.

The secret and exclusive process used in Barreled Sunlight makes possible the guarantee that it will remain white longest. This is the answer to yellowing . . . the bugaboo of ordinary white paints.

Barreled Sunlight is smooth, dirt-resisting, washable as tile. Month after month, it keeps clean, white and bright. So smooth, so non-porous is it that no recesses catch and hold dirt.

These factors, in addition to Barreled Sunlight's tremendous "hiding power" and "ease of flow" (that save labor-time), spell the all-important economy of this pioneer white paint.

For use where excessive heat, steam or other discoloring agents prevail, Barreled Sunlight Chemic Enamel is recommended.

• • •

You are invited to write for the new booklet, "Barreled Sunlight for Food Plants." Address U. S. Gutta Percha Paint Company, 37-J Dudley Street, Providence, R. I. Branches: New York—Chicago—San Francisco. Distributors in all principal cities. (For the Pacific Coast, W. P. Fuller & Co.)

Time-tested in scores of famous food plants . . .

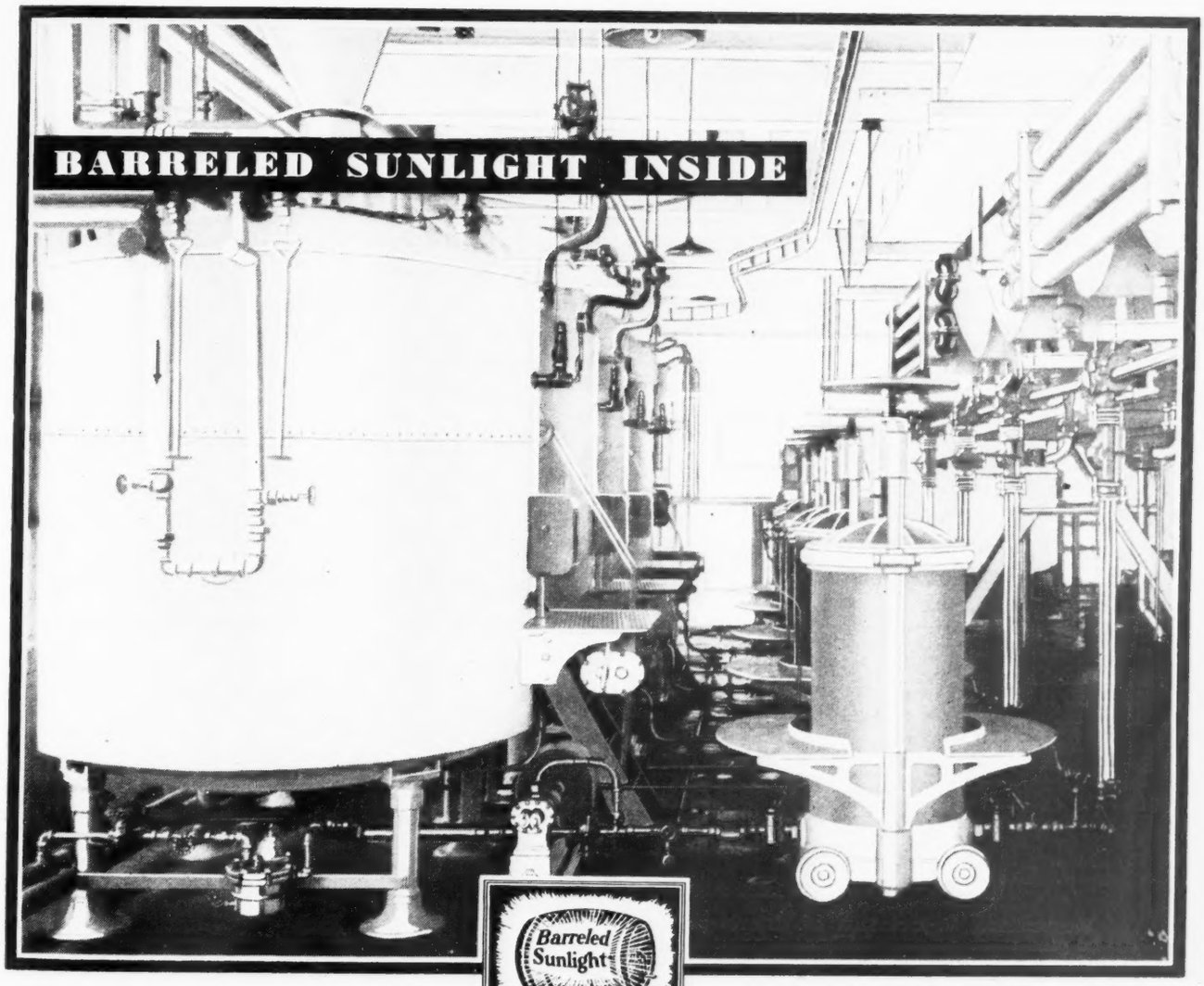
Kellogg Company
W. F. Schrafft & Sons Corp.
College Inn Food Products Co.
Wm. Wrigley Jr. Co.
Sperry Candy Company
Albert Ehlers, Inc.
Crosse & Blackwell, Inc.
Tea Garden Products Corp.
C. F. Mueller Co.
Southern Biscuit Co.
John F. Jelke Co.
Kraft-Phenix Cheese Co.
The Nunnally Co.
E. J. Brach & Sons
Tharinger Macaroni Co.
Life Savers, Inc.

. . . and hundreds of others

Barreled

Reg. U. S.

walls are *Spotlessly Clean!*



An interior view of the Hoffman Beverage Company's plant. Interior surfaces and equipment painted in lasting white with Barreled Sunlight do much to assure the purity of Hoffman Beverages.

GUARANTEE

Barreled Sunlight, The Rice Process White, is guaranteed to remain white longer than any oil gloss paint or enamel, domestic or foreign, applied under the same conditions.

Sunlight

Pat. Off.

INSTANTANEOUS CHILLING

... A brief outline of advantages which acrue to users of Vilter planned "Sharp Freeze" Systems

In Ice-making and Refrigerating, one name looms great . . . Vilter, the pioneer.

The younger generation, overlooking achievements of the past, is prone to discuss the sharp freeze (or "instantaneous chilling") as a very new development. Yet Vilter has an experience in this "new" field which covers a period exceeding fifteen years.

Just what this experience means to any industry contemplating the installation of an instantaneous chilling system is summarized in the data and findings gathered during fifteen years of first-hand study of actual, operating, proved installations.

To all it must be apparent that such a background can have but one result: *The appointment of Vilter to engineer, design, fabricate and erect an instantaneous chilling plant of any size is a virtual guarantee that it will function perfectly, in accord with predetermined figures.*

* * * * *

Vilter Instantaneous Chilling Systems are preferred by users in all sections of America and abroad because of these outstanding advantages:

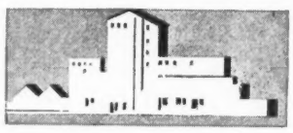
1 . . . Defrosting without hot gas connections—a revolutionary method which saves raising room and coils temperatures approx. 90 deg., eliminates extra connections, valves, fittings, etc., banishes wet floors, etc.

2 . . . Ordinary ammonia receiver capacity makes unnecessary the installation of oversize equipment, thus effecting a considerable saving on cost.

3 . . . Eliminates extra (additional) horsepower required by ammonia circulating pumps—has no accumulators, no liquid pumps; another saving.

4 . . . Operates with a suction gas of MINUS 60 deg. F. (low side). Coil system free from oil collection; no liquid slugs back to compressor.

5 . . . As an instance of the efficiency of the Vilter Instantaneous Chilling System: In a typical installation, there is an average DAILY quick freeze of 125,000 lbs. of pork (whole hams and bellies) from PLUS 40 deg. F. to MINUS 40 deg. F., *in twelve hours!*



* * * * *

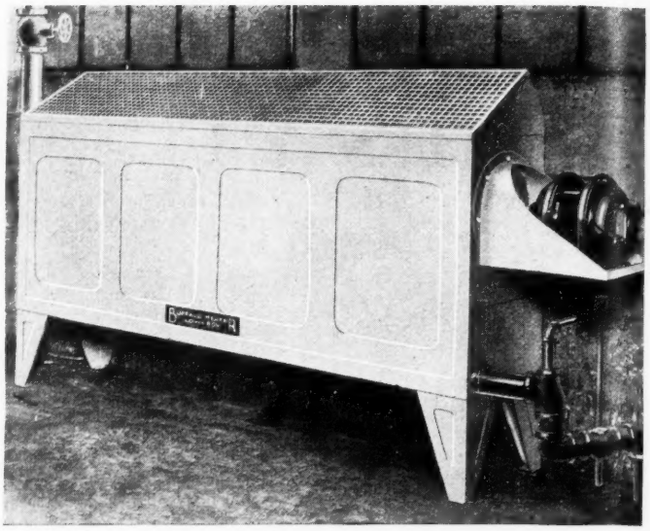
The Engineering Department of this organization will be glad to cooperate with you or your engineers to evolve a quick freeze (instaneous chilling) system adapted to your individual plant requirements.

Write for details without obligation. Or send your blueprints for checking and quotations.

Bulletins, data and special reports on any phase of refrigeration may be had gratis . . . for the asking.

104-30

THE VILTER MANUFACTURING CO.
2115 So. First St. :: MILWAUKEE, WIS.



"Buffalo" Lowboy Unit Heater for glass wall installation

PROPER HEAT DISTRIBUTION

An important factor in every food plant

Food plant engineers appreciate the need for adequate, controlled heating. But how to assure perfect heating for so many different requirements? The answer is in the Buffalo line of Unit Heaters. Here's a complete range—a unit to meet every requirement, exactly and economically.

Low initial cost — economical operation — compactness and accessibility — easy installation—automatic operation. These are only a few of the features that merit your further investigation.

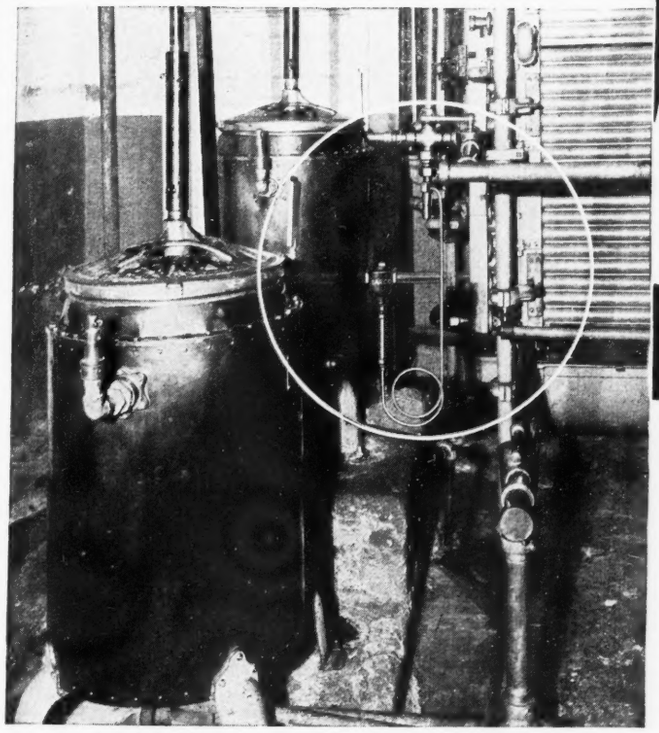
Write us about your heating problems. We will be glad to tell you what type heater is best suited to your needs and give you complete information.

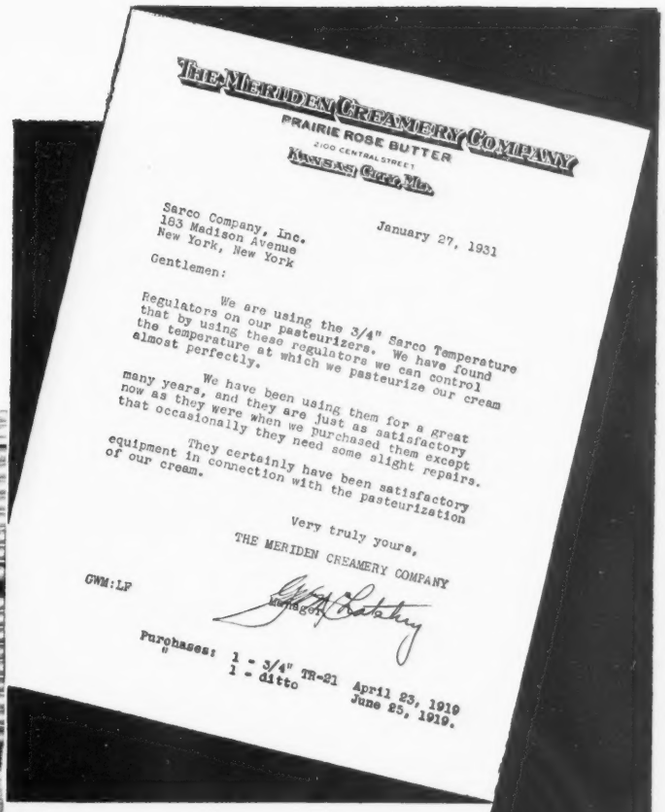
Buffalo Forge Company

181 Mortimer St., Buffalo, N. Y.

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ontario

"We control the temperature almost perfectly"





THE MERIDEN CREAMERY COMPANY
PRAIRIE ROSE BUTTER
2100 CENTRAL STREET
KANSAS CITY, MO.

Sarco Company, Inc.
163 Madison Avenue
New York, New York

January 27, 1931

Gentlemen:

We are using the 3/4" Sarco Temperature Regulators on our pasteurizers. We have found that by using these regulators we can control the temperature at which we pasteurize our cream almost perfectly.

We have been using them for a great many years, and they are just as satisfactory now as they were when we purchased them except that occasionally they need some slight repairs.

They certainly have been satisfactory equipment in connection with the pasteurization of our cream.

Very truly yours,
THE MERIDEN CREAMERY COMPANY

GWM:LF

Purchases: 1 - 3/4" TR-21 April 23, 1919
1 - ditto June 25, 1919.

THAT'S what the Meriden Creamery Co. say in letter herewith regarding Sarco Temperature Regulators in use since 1919.

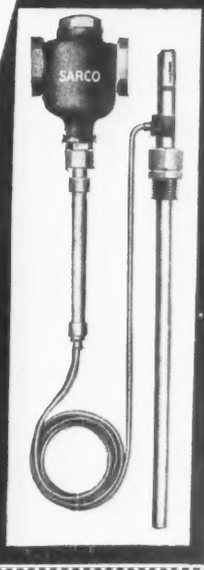
Not only do new Sarco Regulators automatically maintain any temperature from 30 to 300° F. for which they are set, but they hold their accuracy throughout their long life.

Due to the greater power of the Sarco hydraulic thermostatic system, these Regulators have greater sensitivity at all points of the range.

They are entirely self-contained, so need no compressed air, electricity, or water pressure to operate and require no pipe connections.

Sticking and stem leakage are eliminated by the packless sealed valve stem.

Mail the coupon, or write for Booklet AE-70 and our free trial offer.



SARCO COMPANY, INC., 183 Madison Ave., New York, N. Y.

Branches in Principal Cities

Sarco Canada Limited, Federal Building, Toronto, Ont.

SARCO TEMPERATURE REGULATOR

SARCO CO., INC.
183 Madison Ave., New York, N.Y.

Without obligation on our part, you may

☐ Send a copy of Booklet AE-70.

☐ Have a representative call on .....

Firm .....

Street .....

City ..... State .....

Bowen Makes *Two Announcements*

1 — TO BAKERS

The successful completion of the plant designed and built for the Otato Corporation, Burley, Idaho, by the Bowen Research Corporation, now makes Otato available for use by bakeries in all parts of the country.

The facilities of the modern plant insure prompt shipments of spray dried Otato Mash in any quantity.

Otato retains all the natural mineral salts of the potato. And in addition to other advantages it has already won wide acceptance as a means of adding that richness of wheaty aroma in the bread loaf, which is making it easier to build sales.

Write for full details concerning Otato.

2 — TO FOOD MANUFACTURERS

Spray drying has made possible the development of Otato. It has also been applied to eggs, yams, strawberries, pineapple juice, bananas, molasses, corn, barley, oats, milk—to reduce the solids, held in solution or suspension in these products, to a relatively dry powdered condition.

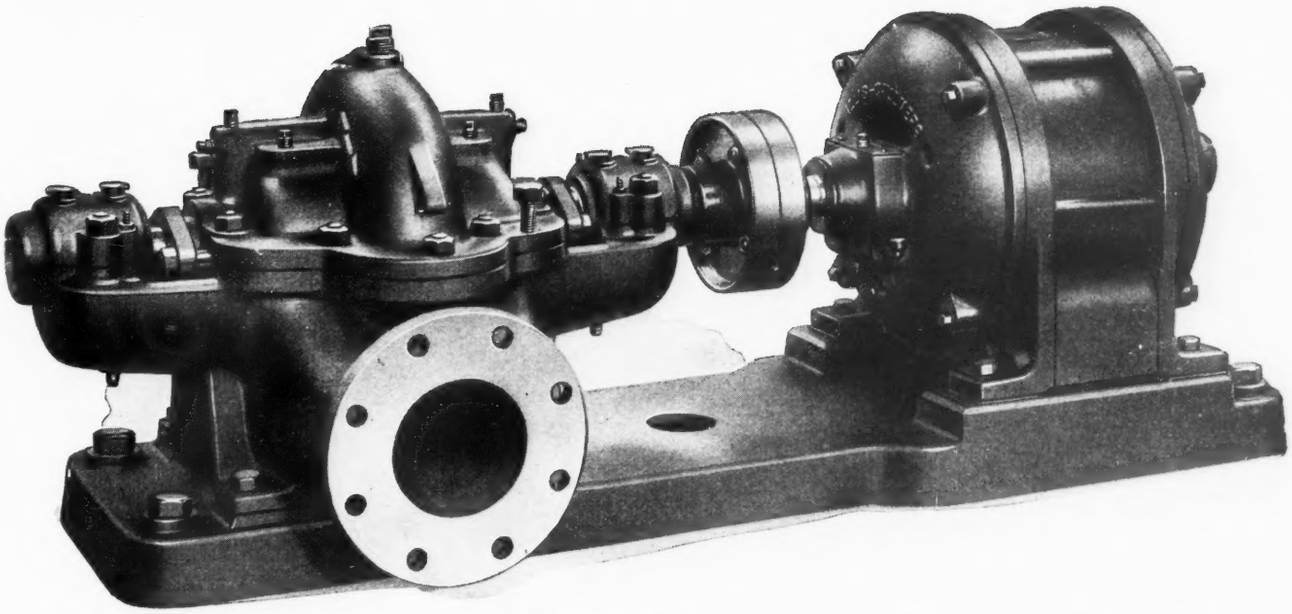
Spray Drying is applicable to many other products in the food industry, creating new products of high sales value. It is advantageous in preserving foods which are perishable in liquid form.

The Bowen Research Corporation is prepared to put spray drying on a profitable basis for any food manufacturer. Its commercial test plant, research engineers, and years of experience in the art of spray drying are at your disposal.

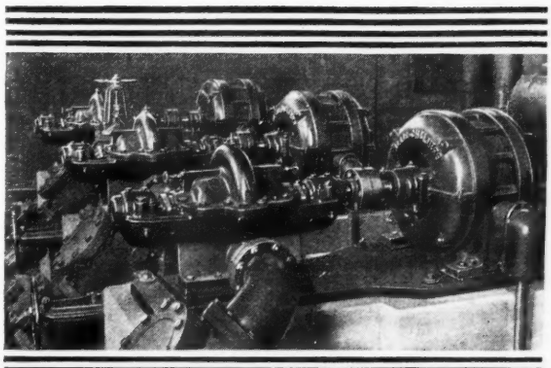
Let Bowen engineers discuss with you the possibilities offered through the use of spray drying.

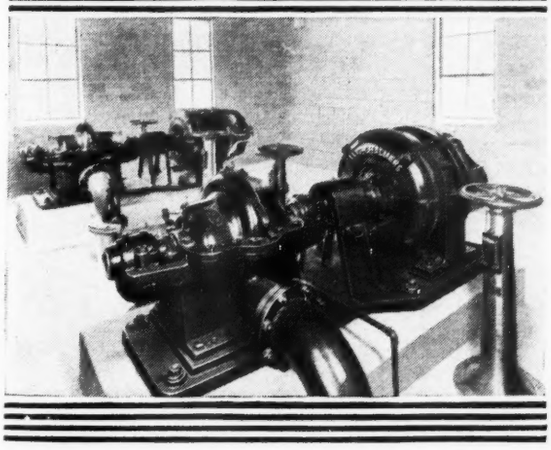
• BOWEN RESEARCH CORPORATION •

117 LIBERTY ST., NEW YORK CITY



... a widely used unit *for* General Purpose Pumping





One of the most popular of the many types of Allis-Chalmers centrifugal pumping units is the type "S", for handling general pumping requirements. This is an improved double suction, split-casing, bronze fitted, horizontal shaft pump designed for long service and high efficiency at a reasonable cost.

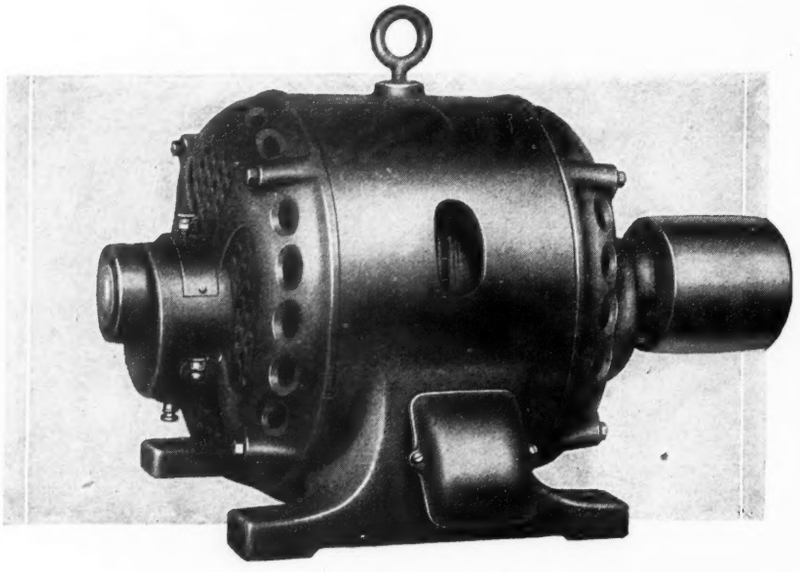
Type "S" units, both pump and motor are built by one company and sold as combined units, give the most pumping value per dollar. All parts, including base plate, are taken from stock with the pump runner selected to meet the requirements for the particular service intended. Then the unit is tested for head, capacity, and efficiency.

Standard Type "S" Units are built in capacities from 30 to 30,000 g.p.m. and for heads up to 300 ft. These together with other types of single and multi-stage Allis-Chalmers pumps, so satisfactorily take care of most pumping requirements that it should pay you to write for our recommendations when considering pumping equipment.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

THEY KEEP A-RUNNING



10 Horse Power Century Type SC Multi-speed Constant Torque Squirrel Cage Induction 3 Phase Motor

More Than One Fixed Speed
with
MULTI-SPEED MOTORS

Constant Horse Power — Constant Torque — Variable Torque

In all installations where variable and constant speed conditions must be unfailingly met, Century Multi-speed Motors "Keep a-Running" . . . Their speeds can be easily regulated either by manual or automatic push button control.

They are built for 2, 3 and 4 speeds, with wide or narrow speed ranges such as 1800/1200 or 1800/600 down to 900/450 R.P.M. (60 cycle). Special speed combinations are also available.

Build in standard sizes from ¼ to 200 horse power, in normal torque, high torque and normal or low starting current types.

Century
MOTORS

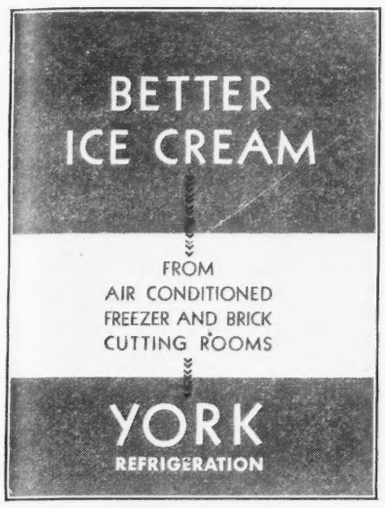
40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

CENTURY ELECTRIC COMPANY, 1806 Pine St., St. Louis, Mo.

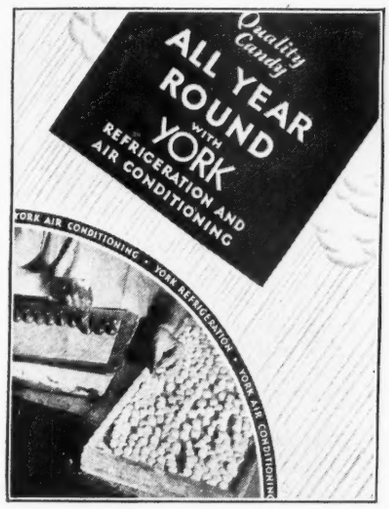
SINGLE PHASE, THREE PHASE AND DIRECT CURRENT MOTORS · MOTOR GENERATOR SETS · ROTARY CONVERTORS · FANS AND VENTILATORS

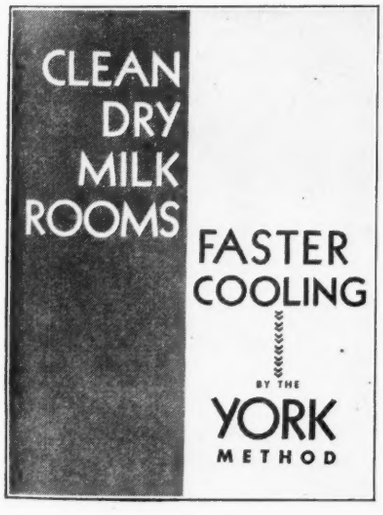
M9-3-10

FOR MORE THAN 27 YEARS AT ST. LOUIS



Better Quality ICE CREAM... CANDY... MILK





York's Three New Booklets Tell How Air Conditioning Improves Quality... Speeds Processes... Reduces Costs

These three booklets have just come off the press. They are based on York's wide experience in designing and manufacturing Air Conditioning Equipment for service in Candy Factories and in Milk and Ice Cream plants.

They discuss the advantages of air conditioning...tell in terms of actual experience how air conditioning in freezer and brick cutting rooms results in better ice cream... how it speeds milk cooling... how it maintains schedules and enhances quality in Candy Plants.

They contain data of actual dollars-and-cents value to operators of these types of plants.

York will be glad to mail you any or all three of these booklets on request. Just check the title you want on the coupon and mail it.

» YORK ICE MACHINERY CORPORATION » YORK, PENNSYLVANIA «

• OTHER FOOD INDUSTRIES

While you may not be interested in these particular booklets, they have this significance to you. York's engineering knowledge and air conditioning experience have not been confined to Candy Factories, and Milk and Ice Cream plants. York has been active in every food industry. York engineers have developed applications in a great many. If air conditioning has not already been applied to your particular industry, York has the experience, the background and the engineering knowledge to pioneer air conditioning in your field. York will be glad to consult with you.

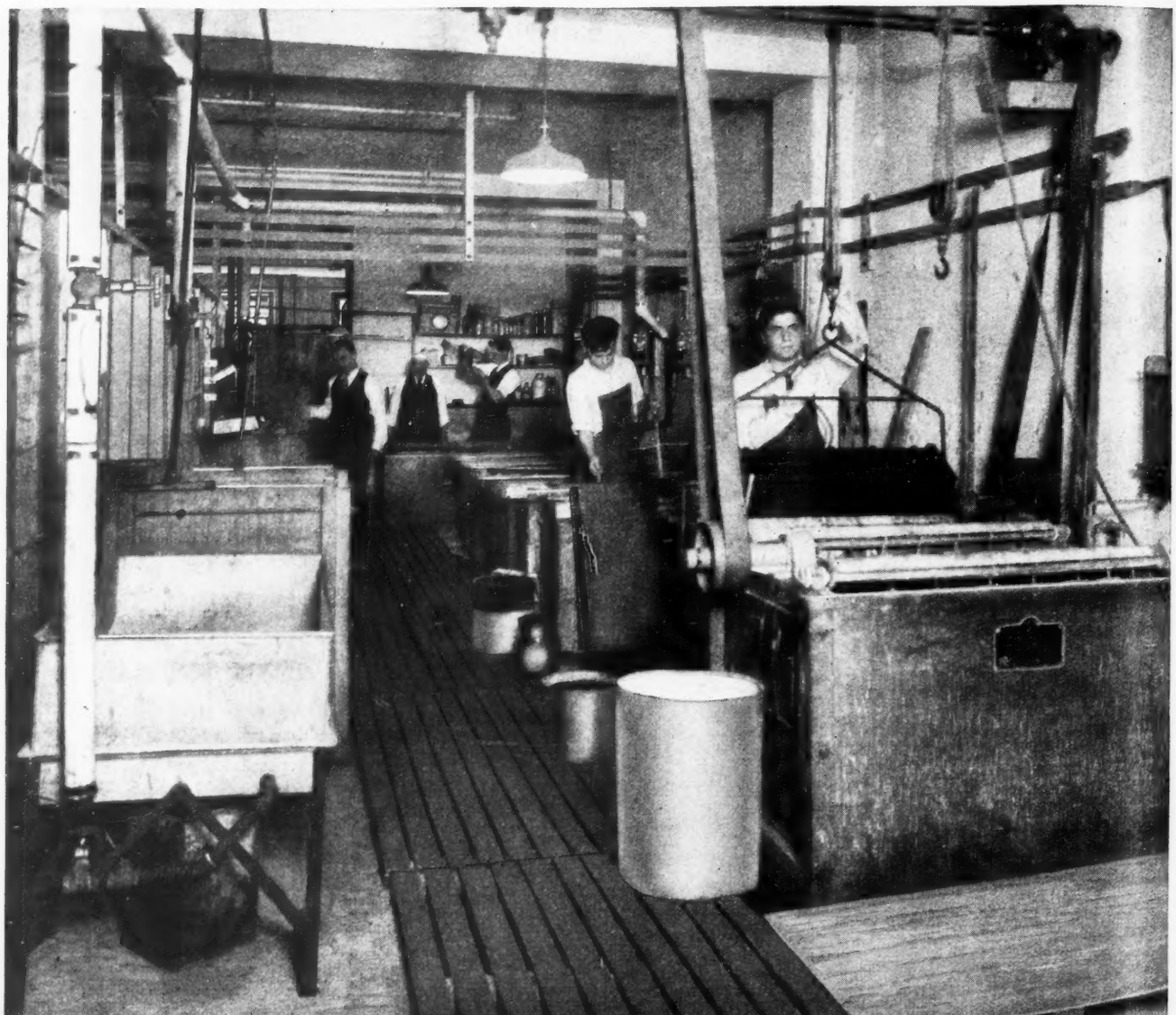
YORK
REFRIGERATION

YORK ICE MACHINERY CORPORATION, YORK, PENNSYLVANIA
Please send me the booklets I have checked. I understand there is no obligation.

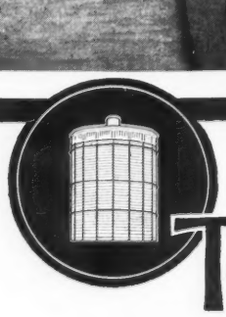
☐ Better Ice Cream from Air Conditioned Freezer and Brick Cutting Rooms
☐ Quality Candy All Year Round
☐ Clean Dry Milk Rooms . . . Faster Cooling

*Name*_____ *Address*_____

*Firm Name*_____ *City*_____



Gas-heated solution tanks for chromium plating



THE problems encountered in solution-heating on any scale are quickly and economically solved by the application of gas heat. Gas-heated tanks last longer; modern turndown equipment keeps idle and waiting tanks on an economy basis. The new book "Gas Heat in Industry" tells how others have found gas heat ideal for solution-heating. Write for it.

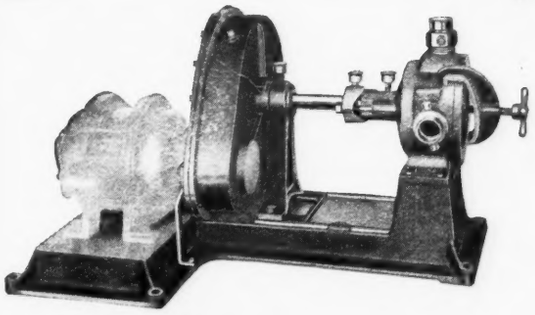
AMERICAN *Gas* ASSOCIATION

420 Lexington Avenue, New York

GAS FOR HEAT WHEREVER HEAT IS NEEDED

You can't afford to experiment with . . .

Economy



Vikings *ASSURE* LOW PLANT COSTS

The present is a poor time to be doing any experimenting in plant pumping costs . . . not when the VIKING Sanitary Rotary PUMP has so thoroughly proven its ECONOMY.

Viking's original cost is very reasonable. It is economical to install. But most important of all . . . Viking enjoys a world-wide reputation for ECONOMY of operation and long life . . . and that after all is the true measure of worth of any pump. Don't experiment . . . install Vikings and be assured of low plant costs.

Write today for FREE Catalog and Special Milk Plant Bulletin.

VIKING PUMP COMPANY

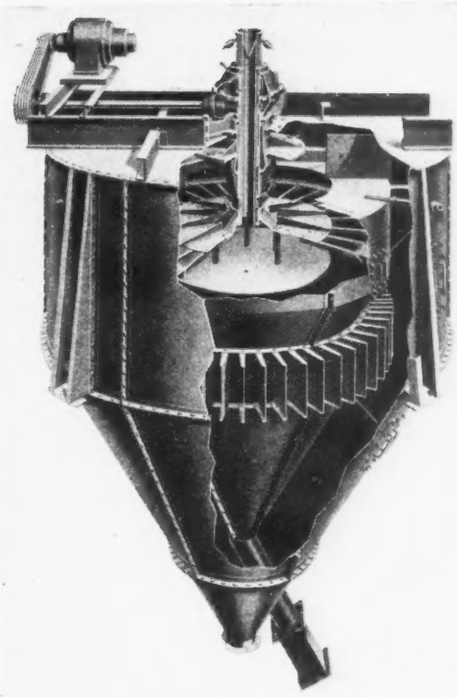
Cedar Falls, Iowa

Viking District Offices located at

CHICAGO, ILL.: 549 W. Washington Blvd.
CLEVELAND, O.: Marshall Bldg., 11 Public Square
DETROIT, MICH.: 6-246 General Motors Bldg.
LOUISVILLE, KY.: 363 Starks Building
MILWAUKEE, WISC.: 2310 West Vliet Street
MINNEAPOLIS, MINN.: 806 Metropolitan Life Bldg
NEW YORK, N. Y.: 342 Madison Avenue
TULSA, OKLA.: 409 East Archer Street

Distributors and Jobbers in All Principal Cities in the United States and Foreign Countries.

VIKING PUMPS



The *super* separator for quality production

FINENESS
UNIFORMITY
DUSTLESSNESS

. . . these are the "Big Three" in the successful manufacture of powdered food products. They are among the many advantages you get by adding the Raymond Mechanical Air Separator to your grinding equipment.

It separates and accurately classifies the pulverized material to any desired fineness up to 300-mesh or better. It delivers a constantly uniform product at any rate of feed or variation in grind. It can be used with almost all types of mills in closed circuit grinding arrangement, assuring dustless and sanitary operation.

The Raymond Mechanical Air Separator is the key to high quality and low cost in making fine cocoa powders and many other finely ground food products. Get the facts about this modern separating unit by mailing the coupon today.

RAYMOND BROS. IMPACT PULVERIZER CO.

Main Office and Works
1310 North Branch Street, Chicago

342 Madison Avenue, New York — Subway Terminal Bldg., Los Angeles

Raymond Bros. Impact Pulverizer Co.
1310 North Branch St., Chicago, Ill.
Gentlemen: Kindly send me the Raymond SEPARATOR BULLETIN
I am interested in separating ..... Product .....
Name of Company .....
Individual .....
Address .....

YESTERDAY *has been* SCRAPPED

TIMES change . . . and success goes to those who keep pace.

Today's problems in your industry are not to be solved by yesterday's methods.

Today's quality standards can not be fully satisfied by yesterday's equipment designs, performance and operating costs.

Keenly aware of this, Cherry-Burrell will present to you, at this year's Dairy Industries Exposition at Atlantic City, new pasteurizers and holders, storage tanks, ice cream freezers, milk heaters, bottle fillers that are of TODAY in every detail . . . new . . . completely in tune with new needs, new conditions.

In the Cherry-Burrell exhibit you will find, on every hand, the answer to your TODAY's cost requirements.

Visit the Cherry-Burrell exhibit. There is much that it will pay you to see.

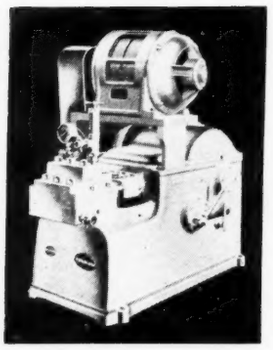


Illustration at left shows the new 1,000-gallon running-in-oil Viscolizer. It meets TODAY'S demand for greater capacity and faster processing. Other models manufactured in 50, 125, 200, 300, 500 and 800-gallon an hour capacities.

TODAY»»» *the* VISCOLIZER

TODAY . . . viscolization is stripped of its mysteries.

TODAY . . . the Viscolizer positively prevents separation in such food products as coffee cream, evaporated milk, tomato juice, ice cream mix, salad dressings, pharmaceuticals, chemicals and a host of other blended products. The "sales appeal" of these products is increased.

TODAY . . . a constant forward march in efficiency having been made, the Viscolizer is standard equipment in the food industries—viscolizing a standard process. Viscolizer sales have mounted constantly and steadily until there are more Viscolizers in use than all other similar type machines.

TODAY . . . all Viscolizer working parts operate in a constant bath of oil. There is force feed lubrication . . . Tex Rope drive . . . Stainless Steel Cylinder Block of Step Valve Design . . . and, of course, the exclusive Duo Visco Valve, found only on the Viscolizer.

TODAY . . . ask for your copy of our new illustrated Bulletin G-155.

"COORDINATED EQUIPMENT" by CHERRY-BURRELL

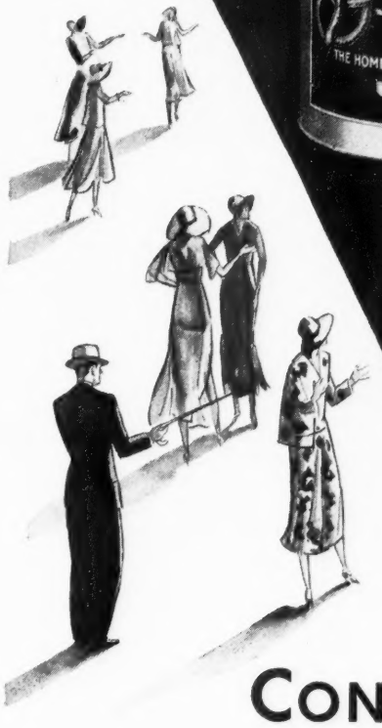
CHERRY-BURRELL CORPORATION
427 W. RANDOLPH ST.
CHICAGO

SILENT SALESMEN

WHEN BUYERS, cash in hand, are deciding what brands to buy — that's where the sales value of *your* container counts most.

Cans, such as those illustrated here, will help in increasing the sales of your food products.

Their modern designs, executed in attractive colors, pull temptingly at buyers' purse-strings.



With more products than ever attractively and conveniently packaged, your container has a real selling job to do in successfully meeting present day competition. Does it measure up?

In the development of new packages, or in modernizing old ones, Continental has helped many manufacturers in the creation of "Packages That Sell." It will pay you well to discuss your can problems with an experienced Continental representative.

"It's Better Packed in Tin"

CONTINENTAL CAN COMPANY, INC.

NEW YORK, 100 East 42nd Street CHICAGO, 111 West Washington Street
SAN FRANCISCO, 155 Montgomery Street

"That's Worth Investigating"

"A" Company used to spend on an average of $77,500 per year for single trip containers.

Last year their costs for shipping in Hackney returnable steel barrels were only $55,180—after taking into consideration such items as depreciation, interest, return freight, extra freight on out-shipments, maintenance, insurance and clerical costs. This meant a saving of $22,320—or about 28.8%.

The above is an example of what many manufacturers have been able to save by using Hackney permanent steel containers instead of light weight shippers. Let us work with you in analyzing your shipping problems to see if similar savings cannot be made in your costs. There is no obligation on your part.

Hackney Seamless Barrels are pressed from single pieces of open hearth steel. There are no body seams of any kind. Furnished with full removable heads or patented raised openings.

A Few Prominent Hackney Users

Frigidaire
Procter & Gamble
Westinghouse Electric
Vacuum Oil
Virginia Smelting
C. & N. W. Ry.
Grasselli Chemical
White Eagle Oil Refg.

1349 Vanderbilt Concourse Bldg., New York City
1173 Continental Bank Bldg., Chicago

PRESSED STEEL TANK COMPANY

5771 Greenfield Ave., Milwaukee, Wis.
477 Roosevelt Bldg., Los Angeles

Hackney
MILWAUKEE

● Plant at Beaver Dam, Wis., one of the numerous milk and cheese plants of the Kraft-Phenix Cheese Corp. in which HTH is used.

Kraft-Phenix Cheese Corporation

GENERAL OFFICES 400 RUSH ST

CHICAGO

July 29, 1931

The Mathieson Alkali Works,
250 Park Avenue,
New York, N. Y.

Gentlemen:

We have been very much pleased with the results obtained in the use of HTH in our various milk and cheese plants. It is efficient, economical and altogether a very satisfactory product.

Very truly yours,
KRAFT PHENIX CHEESE CORPORATION

RAP:NM

Gen. Manager Central Production

KRAFT-PHENIX CHEESE CORP.

"very much pleased with the results obtained in the use of . . .

HTH

"

● Readily soluble in cold water, HTH requires no special equipment. One can of HTH produces 10 gals. of stock hypochlorite solution containing 3% of available chlorine (30,000 p.p.m.) at a cost as low as 15¢ per gallon. Stock solutions may be stored for prolonged periods of time without appreciable loss in strength. ●

NATIONALLY known organizations such as the Kraft-Phenix Cheese Corp. are obtaining excellent results through the daily use of HTH. Low in cost, stable, uniform, highly concentrated, HTH renders chemical sterilization throughout the plant economical, convenient and effective. ● Hypochlorite solutions made with HTH are effective against mold and other bacteria that menace food products. They deodorize as well as disinfect. Properly applied, they render all types of equipment sweet-smelling, germ-free, safe. ● Let this all-purpose sterilizer safeguard your products . . . help solve your most difficult sanitation problems. Order a supply today through your regular supply house or write direct for helpful literature and prices.

The MATHIESON ALKALI WORKS (Inc.) 250 Park Avenue, New York, N. Y.

HIGH SPOTS IN CHEMICAL HISTORY

No. 1 of a series of advertisements tracing the development and uses of modern chemicals

AMMONIA

To Joseph Priestley belongs the distinction of establishing the fact that ammonia is composed of hydrogen and nitrogen.

IN 1774, Joseph Priestley, heating a mysterious looking substance over a fireplace, drove a protesting family from his humble cottage in Leeds, England. The biting, pungent fumes came from ammonia—a mixture of nitrogen and hydrogen which the chemist-minister had collected over mercury. More than one hundred and fifty years later the same colorless gas was to become one of the world's most useful commodities.

Today, the manufacture of synthetic ammonia together with improved methods for its transportation and handling, mark one of the greatest triumphs of chemical engineering. Thousands of tons of ammonia are used annually by the refrigeration industry. The use of ammonia for making nitric acid has effected exceptional economies in producing explosives, synthetic fabrics and other cellulose products. The manufacture of high nitrogen fertilizers from ammonia seems destined to render American agriculture independent of foreign sources of supply.

Anhydrous ammonia is used to supply nitrous gases in manufacturing sulphuric acid ...in nitriding steel, which is equivalent to case hardening... for neutralizing acids in oil refining...as a raw material in organic synthesis...as an important source of hydrogen or nitrogen in welding operations.

One of the most important recent developments in the use of ammonia in combination with chlorine is in treating water supplies. Preammoniation treatment of water prevents unpleasant tastes and odors, increases the efficiency of chlorine and is simple and economical to apply.

Constant improvements in manufacturing processes have given American anhydrous ammonia users the benefits of a most economical and most useful alkali—one of several circumstances that has speeded the progress of chemical engineering.

• • •

As one of the oldest producers of synthetic anhydrous ammonia in the United States, Mathieson is able to offer ammonia users the product quality and complete service available only where modern, economical methods of production and distribution prevail.

MATHIESON CHEMICALS

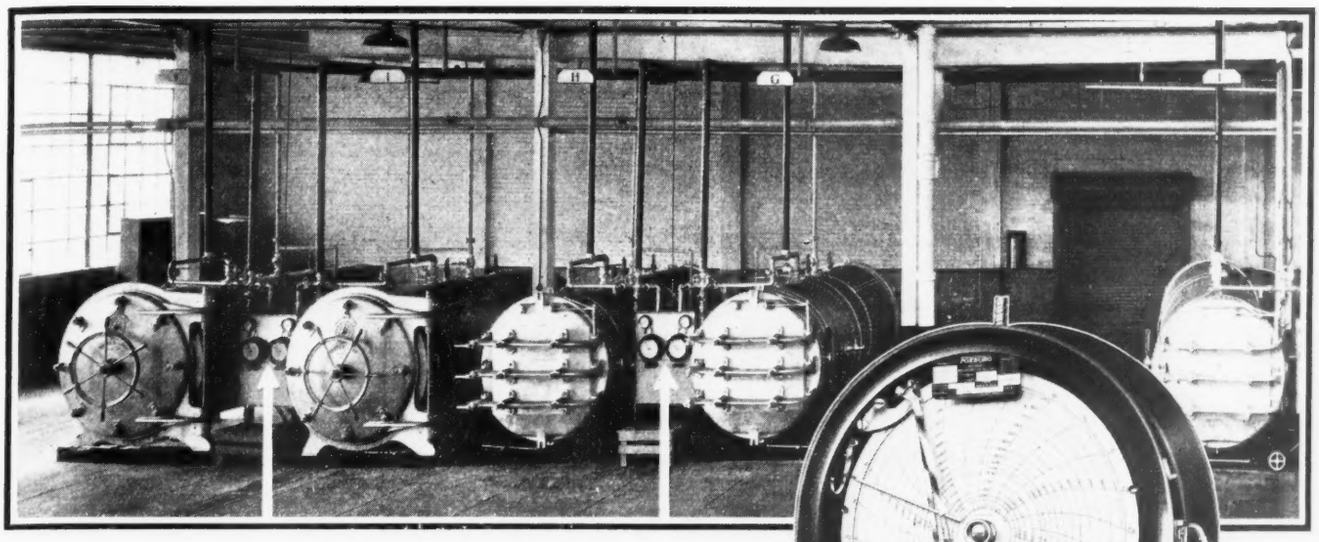
Great Structures Rest on Strong Foundations

MATHIESON CHEMICALS
SERVICE
RESOURCES | RESEARCH

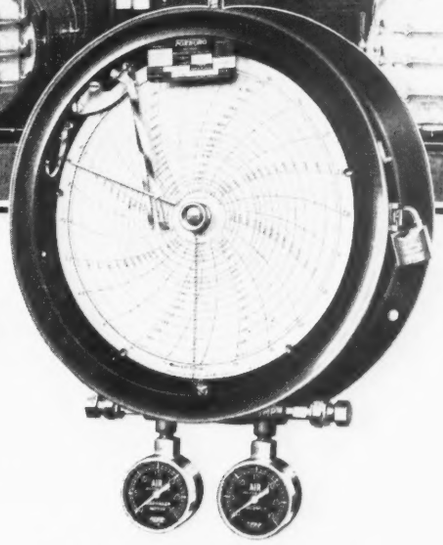
PRINTED IN U.S.A.

Soda Ash . . . Caustic Soda . . . Bicarbonate of Soda . . .
HTH (Hypochlorite)...Liquid Chlorine...Bleaching Powder...
Ammonia, Anhydrous and Aqua...PURITE (Fused Soda Ash)

The MATHIESON ALKALI WORKS (*Inc.*)
250 PARK AVENUE, NEW YORK, N. Y.
Philadelphia Chicago Providence Charlotte Cincinnati
Works: Niagara Falls, N. Y., Saltville, Va. *Warehouse stocks at all Distributing Centers*



Model Instruments in a Model Plant - - -



Foxboro Automatic Temperature Recorder-Controller

The Standard Canning Instrument for controlling temperatures on cookers, ovens, sterilizers, retorts, kettles, enrobers, proof rooms, dryers, etc.

Records and controls from the same thermal element, which insures accuracy.

HERE are some of the many canning retorts of the California Packing Corporation equipped with Foxboro Temperature Recorder-Controllers.

The management recognizes the necessity of close and accurate temperature control to insure the uniform quality of their Del Monte and other products, to increase production, and to save time, steam, and labor.

During the last four years they have bought nearly 500 Foxboro Controllers and a large number of Indicating and Recording Thermometers to handle the critical temperature problems of various processes.

The accuracy and dependability of Foxboro Control are known throughout the food industry. Automatic, air-actuated, exact and durable, the instruments are built to stand the gaff. If a process can be controlled, Foxboro can control it.

Foxboro Engineering Service is as dependable as the Instruments. If you want successful and economical control, write to us—Dept. B. We can guarantee it.

THE FOXBORO COMPANY

Neponset Avenue, Foxboro, Mass., U. S. A.

WESTERN OFFICES

Los Angeles, 2307 East 8th St.
San Francisco, 461 Market St.
Portland, Ore., 816 Lewis Bldg.

New York, Boston, Detroit, Chicago, Atlanta, Rochester, N. Y., Philadelphia, Tulsa, Dallas, Pittsburgh, Cleveland, Salt Lake City

FOXBORO

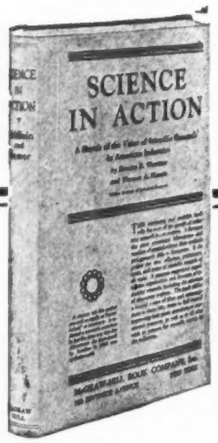
REG. U. S. PAT. OFF.

THE COMPASS OF INDUSTRY

INSTRUMENTS *for* CONTROLLING, RECORDING *and* INDICATING TEMPERATURE, FLOW, HUMIDITY *and* PRESSURE

Just published!

. . . a survey of the place of research in industry



This interesting and readable book is planned to give the business man, engineer and scientist a comprehensive picture of the place of science in industry—the means and methods of industrial research, the results achieved, the important factors in procedure and the choice of workers.

Science in Action

A Sketch of the Value of Scientific Research in American Industries

by **EDWARD R. WEIDLEIN**
and **WILLIAM A. HAMOR**

Mellon Institute of Industrial Research

310 pages, 6x9, 32 illustrations, $3.00

HERE is a fruitful source of ideas for all who wish to find ways of improving their plant operations or commercial practices, or who wish to prepare for scientific careers in the industries. The authors, long identified with the work, have compiled a wealth of interesting facts that picture clearly the rise, influence, spirit and status of scientific research in important fields of American manufacture.

Referring to the prominent laboratories and workers, the book indicates the means and methods of scientific research —suggests by showing what results have already been achieved, what may be expected from science as a tool in meeting many of the problems of production and merchandising. It is a live and informative account, comprehensive to the point of offering practical suggestions on the organization and direction of industrial research, including the selection of laboratory workers.

Covers such topics as:

—types of industrial-research laboratories
—scientific research on the necessities of life
—successes of scientific research in familiar industries
—some scientific research contributions to engineering economics
—industrial research in the reduction of wastage
—exploits of science with plastics
—new industries through chemical synthesis
etc.

See it 10 days free—send this coupon

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FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York

Send me Weidlein and Hamor—Science in Action, postpaid, for 10 days' free examination. I agree to send $3.00 or return the book within 10 days of receipt.

Signed .....

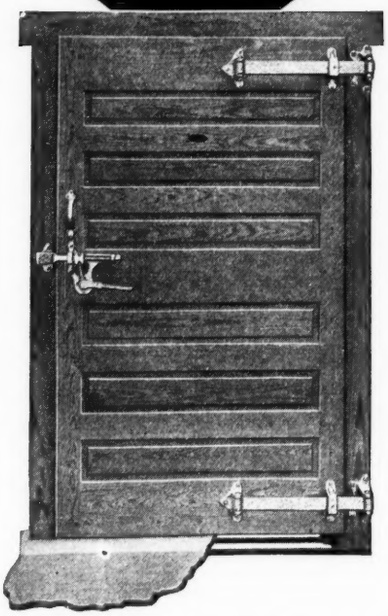
Address .....

City and State .....

Official Position .....

Name of Company .....Food 10-31

GUARANTEED
TO OUTLAST ANY OTHER MAKE OF DOOR— ANY CONDITIONS —AT ANY PRICE



There is no "just as good" unless it is another Jamison Door. Back of it is a record of service—made possible by its rugged construction and extra strong hardware—that has led to thousands of reorders. *With* it is a guarantee that it will give more service than any other door—at any price.

Write for catalog and details on the new Wedgetight Fastener

JAMISON COLD STORAGE DOOR CO.
CONSOLIDATING JAMISON COLD STORAGE DOOR CO., INC.
AND STEVENSON COLD STORAGE DOOR CO.
HAGERSTOWN, MARYLAND, U. S. A.
Oldest and largest makers of Cold Storage Doors in the World

Branches: 300 Madison Ave., NEW YORK. Builders Bldg., CHICAGO
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4019 Gaston Ave., DALLAS.....SAN FRANCISCO
Agents: Gay Engineering Co., 2650 Santa Fe Ave., LOS ANGELES
.....D. E. Fryer & Company, SEATTLE and SPOKANE.....
Southern Ice Supply Co., MARIETTA, GA .....
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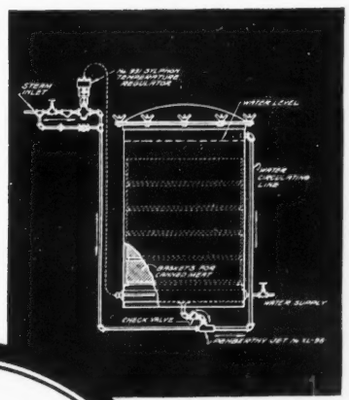
Jamison & Stevenson Cold Storage Doors

OLDEST and LARGEST makers of Cold Storage DOORS

FULTON *Sylphon* TRADE MARK FOR TEMPERATURE CONTROL

in MEAT PACKING



No. 931 Sylphon Regulator controlling temperature of circulating water in a Cooker for canned meat.

SMOKE ROOM
CHILL ROOMS
CURING VATS
COLD STORAGE
PICKLE TANKS
SCALDING VATS
COOKERS DRYERS
BOILERS
MELTERS

"Everything but the squeal" expresses well the thoroughness of modern meat packing methods. It is natural that this great industry should have come to Fulton Sylphon — likewise thorough-going specialists — for temperature controlling equipment vital in ten important processes in meat preparation.

Fulton Sylphon's reputation as pioneers—leaders in the design, manufacture and application of temperature regulators — is recognized by many leading industries. This organization's experience, gathered over almost 30 years of first hand contact and study of various temperature requirements — their plant, the largest in the world devoted exclusively to temperature control equipment — their record of accomplishment, over 200,000 installations that have given years of highly satisfactory, trouble-free service — are facts that offer some measure of the scope of this organization's ability to serve you.

When you think of temperature, think of Fulton Sylphon. Write for a representative to call, or tell us your problems and we will send you further information about equipment designed specifically for your requirements.

FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

European Representatives, Crosby Valve and Eng. Co., Ltd., 41-2 Foley St., London, W. I., Eng.; Canadian Representatives, Darling Bros., Ltd., 140 Prince St., Montreal, Que., Can.

REPRESENTATIVES IN ALL PRINCIPAL CITIES IN U. S. A.

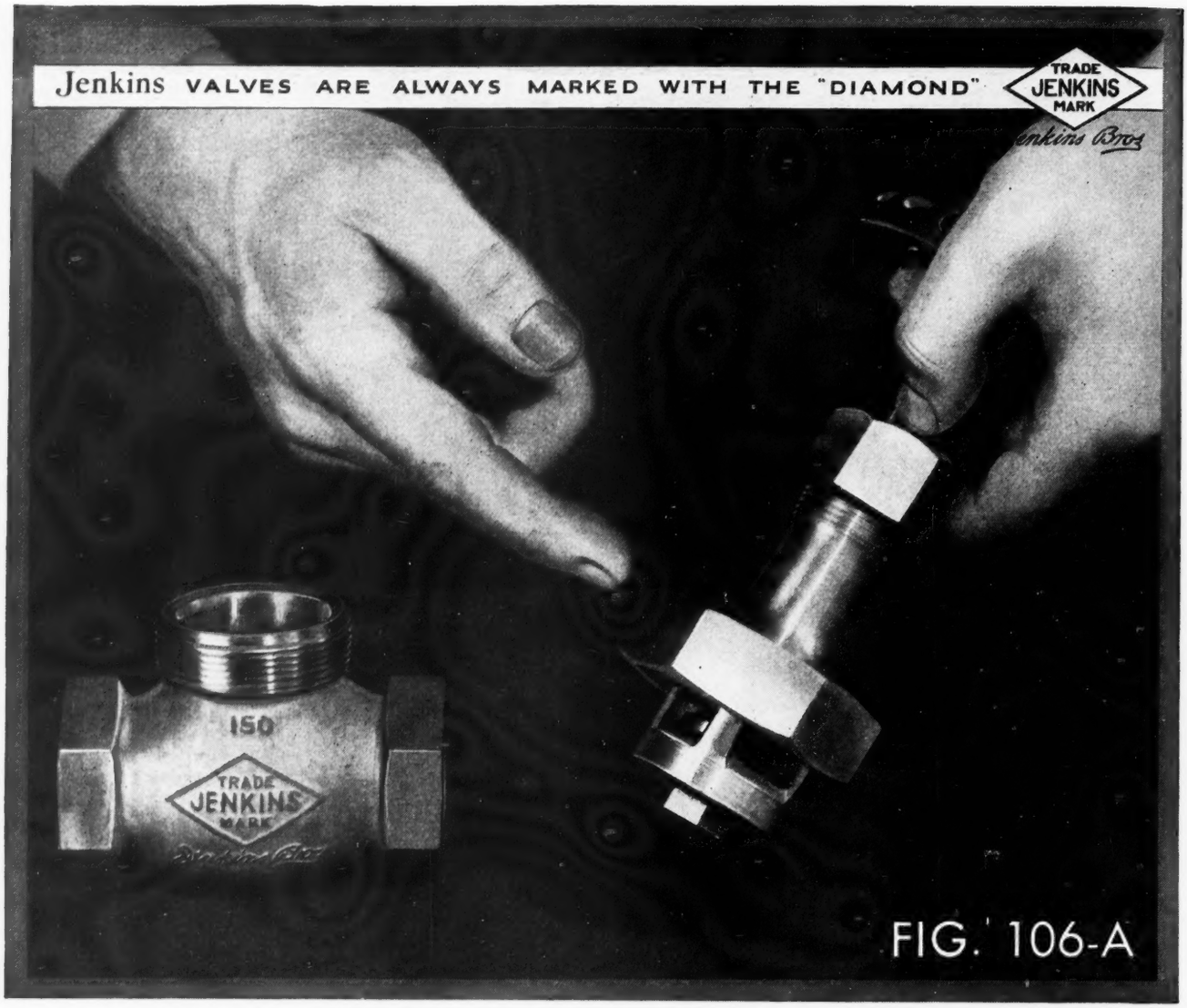


Fig. 106-A Jenkins Standard Bronze Globe Valve, Screwed. For 150 lbs. steam or 250 lbs. water working pressure. Special features are one-piece screw-over bonnet, and slip-on stay-on disc holder.

This Bonnet has Unity, Solidity, Durability

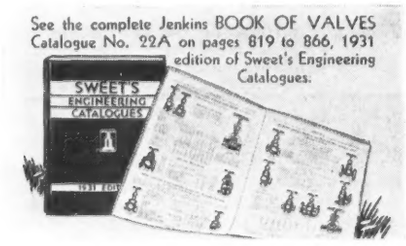
BY combining the two unique advantages of the one-piece screw-over bonnet and the slip-on stay-on disc holder, Fig. 106-A is in a class by itself. There is no other standard bronze globe valve like it.

This bonnet is cast in a single solid piece. Of generous proportions, it has unusual strength. You can take it off the body repeatedly and it won't distort. Neither will it spring.

Note the large generous faces of the hexagon. Providing more than ample purchase for the wrench, they make it easy to remove the bonnet.

Fig. 106-A has more spindle threads in contact with the bonnet, an extra deep stuffing box holding more packing, and, of course, the Jenkins renewable disc which insures leak-tight closing.

This series is also made in angle, cross, and check patterns. At your supply house. Write to us for Form 141.


See the complete Jenkins BOOK OF VALVES Catalogue No. 22A on pages 819 to 866, 1931 edition of Sweet's Engineering Catalogues.
SWEET'S ENGINEERING CATALOGUES

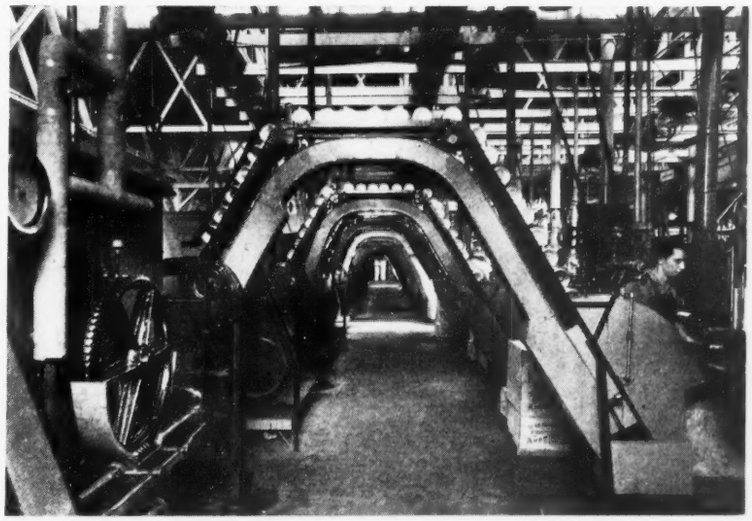
♦

JENKINS BROS.

80 White St., New York, N. Y.; 524 Atlantic Avenue, Boston, Mass.; 133 No. Seventh St., Philadelphia, Pa.; 646 Washington Blvd., Chicago, Ill.; 1121 No. San Jacinto, Houston, Texas. JENKINS BROS., Limited, Montreal, Canada; London, Eng. Factories: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Canada

Jenkins
BRONZE IRON STEEL
VALVES
Since 1864

No. 11 is an A-B Equipped Plant



THE CANNING LINES
CALIFORNIA PACKING CORPORATION
SACRAMENTO PLANT NO. 11

•

LYE PEELERS
GRADERS
CANNING TABLES
SLICERS
SYRUPERS
EXHAUSTERS
COOKERS

ALL built by Anderson-Barngrover of San Jose—whose equipment is installed in all "Del Monte" plants and nearly all Fruit Canneries.

A-B is an important division of Food Machinery Corporation —builders of machinery for Canners throughout the world—whether it's Peaches—Pineapples—Berries—Corn—Peas—Tomatoes—Meats or Milk——

Sprayers and Dusters to control insects and fungus——

Washers—Polishers—Sizers—complete equipments for Packers and Shippers of fresh Apples—Pears—Plums—Oranges—Lemons—Grapefruit——

•

If you have a Canning—a Growing—or a Shipping Problem—we can help—please use the coupon and let us tell you how we operate.

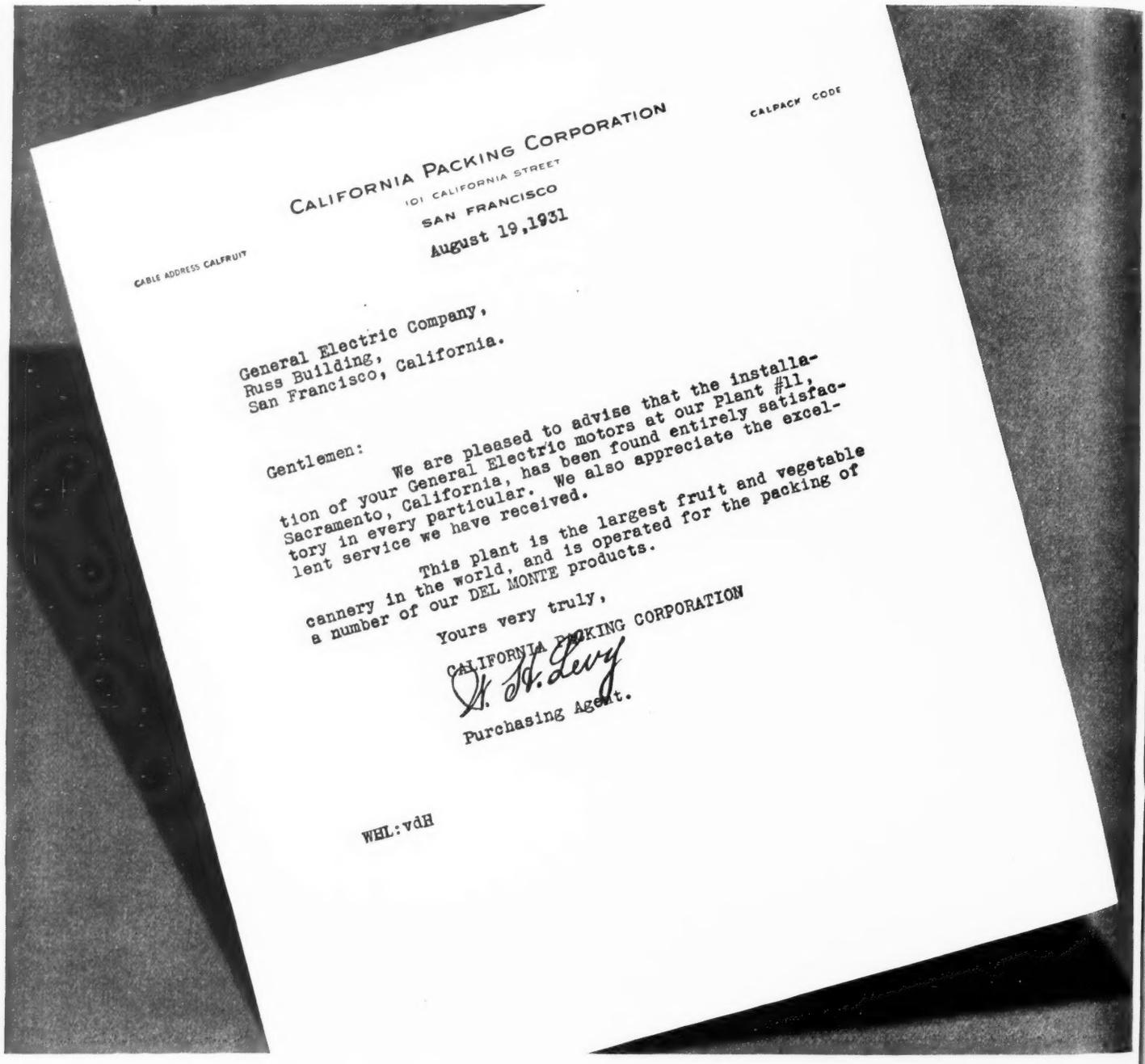
FOOD MACHINERY CORPORATION
General Sales Offices
70 Pine St. San Francisco

FOOD MACHINERY CORPORATION
70 Pine St., San Francisco, Cal.

Please send "Ideals" telling the story of Food Machinery Corporation—no obligation to me.

Name .....
Position .....
Firm .....
Address .....

Del Monte Quality



CALIFORNIA PACKING CORPORATION
CALPACK CODE
101 CALIFORNIA STREET
SAN FRANCISCO
CABLE ADDRESS CALFRUIT
August 19,1931

General Electric Company,
Russ Building,
San Francisco, California.

Gentlemen:

We are pleased to advise that the installation of your General Electric motors at our Plant #11, Sacramento, California, has been found entirely satisfactory in every particular. We also appreciate the excellent service we have received.

This plant is the largest fruit and vegetable cannery in the world, and is operated for the packing of a number of our DEL MONTE products.

Yours very truly,

CALIFORNIA PACKING CORPORATION

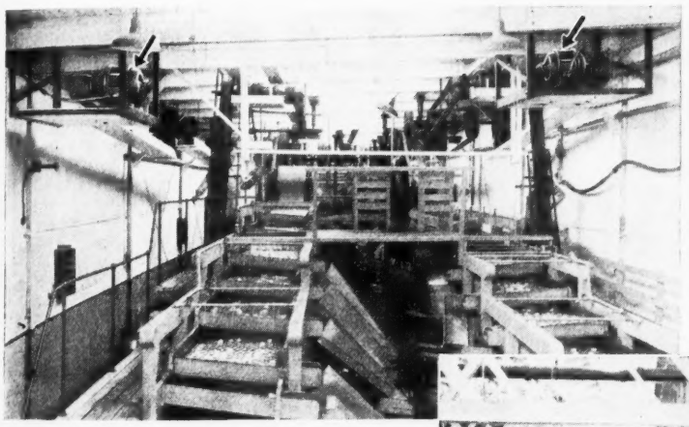
W. H. Levy

Purchasing Agent.

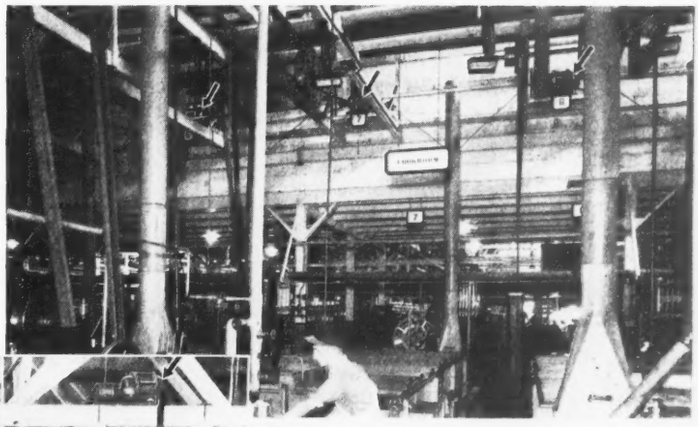
WHL:vdH

G-E dependability, like Del Monte quality, has won world-wide recognition and is the result of many factors which should always be considered when plant equipment is purchased for a going concern. ◆ Some of these factors are: highly trained G-E field engineers, who know the food-products industry; a line of equipment so large that these sales engineers can select the right motor and the right control for every drive; adequate warehouse stocks to meet emergencies; service shops within phone call day or night; and a good renewal-part service that locates the correct part quickly and at a reasonable price. ◆Your equipment manufacturer will supply machines already equipped with G-E motors and control. Or call your nearest G-E office or motor dealer.

G-E Dependability in the world's largest fruit and vegetable cannery

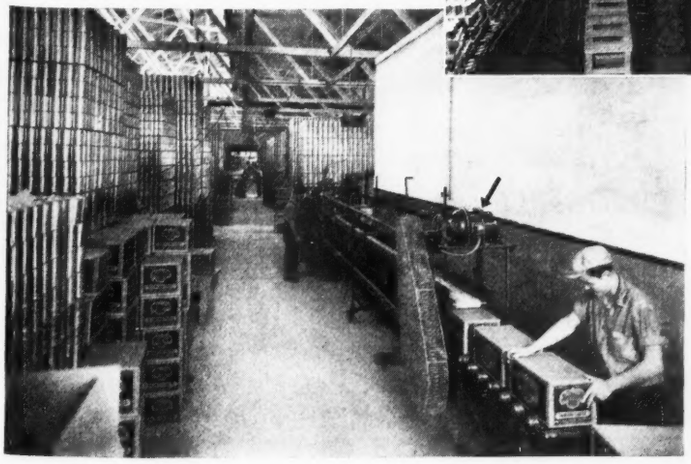


Two G-E 15-hp. motors driving grading equipment

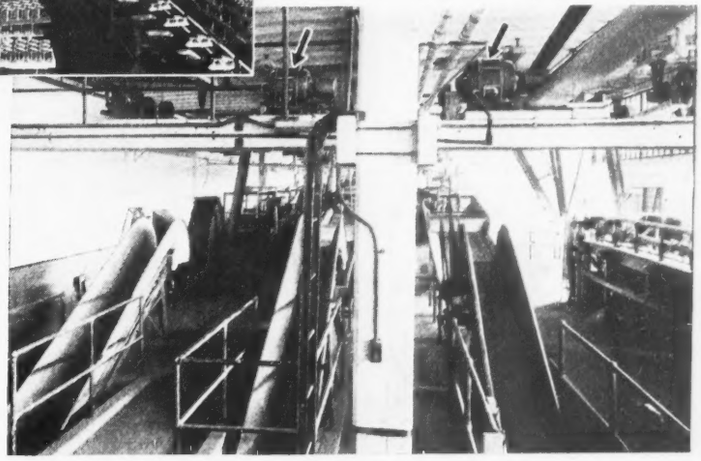


Three G-E 7½-hp. motors driving cook-room equipment

General Electric's famous Type SCR single-phase motor operating a sealing machine



One G-E 15-hp. and one G-E 20-hp. motor driving spinach equipment

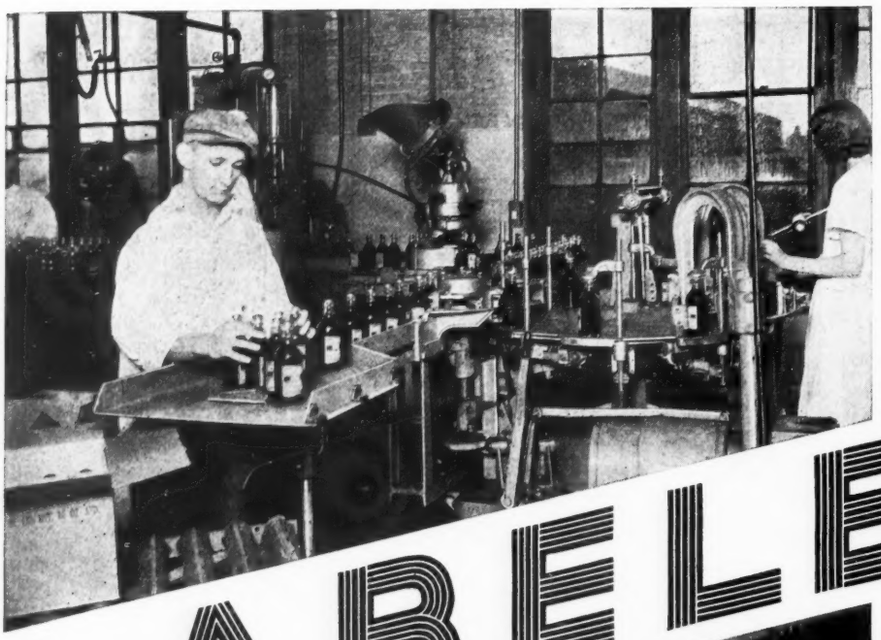


Above, center: G-E 15-hp. motor for canning-table drives

200-531

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES



LABELED

IN THE SAME POSITION ON EVERY CONTAINER

Oelerich & Berry's "Wafflegood" and "Old Manse" Syrup

Labeled Accurately on O & J Labelers

ACCURACY is just one of the reasons why Oelerich & Berry decided on O & J Machines for labeling their "Old Manse" and "Wafflegood" Syrups.

The label on the "Wafflegood" jug shown above is affixed to every jug in exactly the same position with respect to the ear, or handle of the jug.

In a letter recently received from Mr. F. J. Oelerich, he says, "The packages come through in perfect shape, labels on straight and glass clean, not smeared up with glue. . . . . We gladly recommend O & J Automatic Labeling for clean, accurate and quantity production."

O & J Labelers are saving up to $1390.00 per machine every year for one prominent manufacturer. If you would like to see the complete figures on these savings, mail the coupon.

Liquid

COUPON

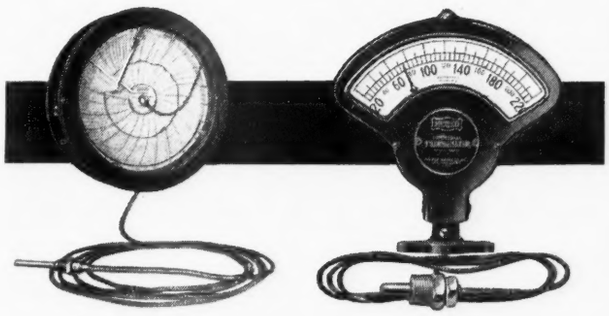
THE LIQUID CARBONIC CORPORATION, *O & J Division,* Dept. L-16, 3100 S. Kedzie Ave., Chicago, Ill.
I would like to see a complete report on savings effected by O&J Labelers in plants like mine. No obligation.

Firm Name ..... *See Mr.* .....

Address ..... *City and State* .....

IF IT'S ACCURATE TEMPERATURE CONTROL YOU WANT

▲ ▲ ▲ *Look to Motoco industrial thermometers*



Recording Thermometer Model "1000"

Standard Type Industrial Thermometer

WHEREVER accurate knowledge of temperature is vital to your manufacturing operations, you can put a Motoco Thermometer to work—safe in the assurance that it will tell the facts dependably.

Motoco temperature Thermometers, including the Model "1000" recording type, are precision-built by an organization with more than twenty years experience in the design and construction of quality instruments. In your industry and in scores of others, these sturdy, modern thermometers have proved themselves conclusively. Here, to be sure, are ample safeguards to justify your choice today.

Without obligation on your part, our engineers will gladly discuss your temperature control problems.

The Moto Meter line includes both vacuum and pressure gauges in various types and to fit a wide variety of uses.

MOTO METER

GAUGE & EQUIPMENT CORPORATION

TOLEDO, OHIO

LA CROSSE · CANADA · ENGLAND · FRANCE · GERMANY · AUSTRALIA

The BANNER of PERFECTION
• SANITARY—EASY TO CLEAN
• NON-CHURNING HELICAL GEARS
• QUIET—NO RECIPROCATING PARTS
• SIMPLE AND DURABLE ONLY TWO MOVING PARTS
PUMPS

NO VALVES in this pump

Just two *helical* gears—constantly in mesh, make up the entire moving element of the Perfection Pump. No valves, no springs, no reciprocating parts.

Because of the *helical* cut of these gears the liquid is drawn into the pump and forced out with a minimum of agitation or churning, but with positive displacement and an even pulsationless flow.

The model illustrated below,—chain drive or V belt drive,—takes up very little floor space. Another advantage,—the motor is mounted on top of a pedestal,—up off the floor.

Milk, cream, ice cream mix, fruit juices, and hundreds of other liquid food products can be pumped satisfactorily with a Perfection Pump. It is especially adapted for pumping thick liquids.

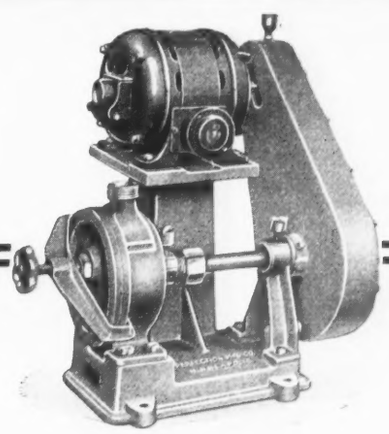
Ask for our Bulletin 284.

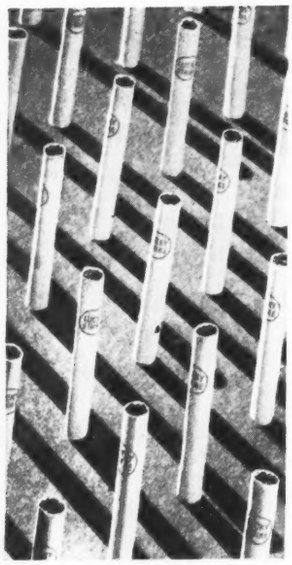
PERFECTION MFG. CO.

2186 EAST HENNEPIN AVENUE

MINNEAPOLIS MINNESOTA

PERFECTION ROTARY PUMPS





They don't have to "Reach for a Lucky"

in this "Lucky Strike" Plant

Lamson Conveyors *speed a Hundred Million a day from process to process*

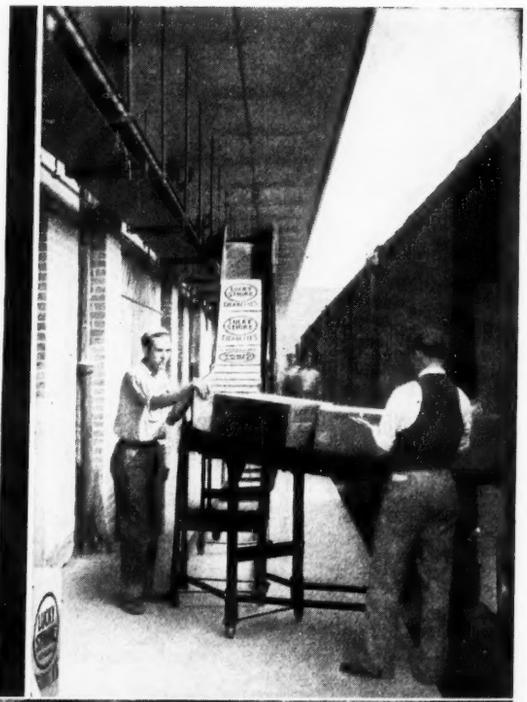
FROM one plant—a hundred million individual cigarettes—ten car loads—in one working day!

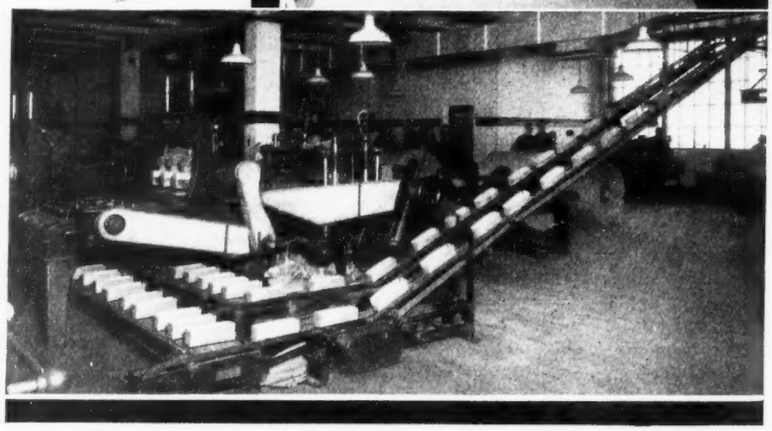
Production as great as this—running into almost astronomical figures—*must* flow smoothly. Cigarette machines—264 of them—must be kept busy, uniformly and without a gap. "Bottlenecks," where work piles up, cannot be tolerated. Every smallest operation must be co-ordinated, cogged, with the next and the next—straight down the line from raw tobacco to pasted carton.

Hence it is that the American Tobacco Company, in Richmond, uses Lamson Conveyors. Thus it maintains speed and efficiency—eliminates waste and confusion—regulates the flow of materials and finished product, from tobacco leaf to freight car.

If you manufacture any commodity—large or small—in quantity, you can produce it faster and at a lower cost through the use of Lamson Conveyors. Lamson representatives are ready to work with your plant executives and engineers in planning conveyor systems and estimating potential savings. Simply write, and a representative will call at your convenience. You incur no obligation. The Lamson Company, Syracuse, New York.

Movable slide deflects cartons from overhead belt into freight cars.





Empty cartons pour from "making machines" and hurry to the packing section, at more than 200 feet a minute.

LAMSON CONVEYORS

BEAR BRAND LYE PEELS THE PEACHES FOR CALPACK . . . .

AT PLANT ELEVEN peeling the peaches is the job of Bear Brand Lye. At twenty-six other Calpack Plants you'll also find Bear Lye on the job, doing its part to prepare good fruit for packing. Its good performance helps to keep operating costs low and efficiency high.

Speedy access to Western Packers from the Great Western Plant at Pittsburg, California, makes Bear Lye available at any point practically overnight, in any quantity from a drum to a carload.

GREAT WESTERN ELECTRO-CHEMICAL CO.

9 Main Street
San Francisco

Plant at
Pittsburg, Calif.

SLAT TYPE CONVEYORS

Frame is usually composed of four angles, upper pair for carrying the loaded apron, and the lower two for return apron. Standard chains used are either malleable, or steel for heavier duty. Slats are made in maple, flat steel, channel iron, and No. 2 gauge pressed steel of channel shape. The gearing and bearings are of the open type. Gears are all guarded. The bearings are all of the ball and socket self-aligning type with interchangeable bronze bushings. The usual speed of the slat conveyor is 40 to 60 feet per minute. The take-up units for slat conveyors are all of the horizontal stationary screw type. The take-up sprockets rotate or idle on a non-rotating shaft and these are also bronze bushed.

Standard Conveyors offer the construction your handling requires

A complete Standard Conveyor System can be composed of numerous types. Each serves a particular purpose and is most adaptable to your requirements.

The value of Standard Conveyor construction is that it makes each type highly serviceable and economical. Even though you have a very unusual handling problem, Standard Conveyors (all types) serve as though they were planned exclusively for your needs.

It doesn't make any difference whether your product is light or heavy, large, small, or fragile, or how your plant is laid out—if you need better methods of handling, our conveyor counsellors can be of help.

STANDARD CONVEYOR COMPANY

NORTH SAINT PAUL, MINNESOTA

Atlanta Office, 369 4th St.
Baltimore Office, 15 W. Franklin St.
Beaumont (Tex.) Office, P. O. Box 402.
Birmingham Office, 1202 Martin Bldg.
Boston Office, 755 Boylston St.
Bridgeport Office, 406 Court Exch. Bldg.
Buffalo Office, 454 Ellicott Square
Butte (Mont.) Office, 51 E. Broadway
Chicago Office, 400 W. Madison St.
Cincinnati Office, 1106 Ingalls Bldg.
Cleveland Office, 5005 Euclid Ave.
Denver Office, 1420 Sixteenth St.
Detroit Office, 420 U. S. Mortgage Bldg.
Evansville Office, 20 Furniture Bldg.
Fort Wayne Office, 816 Kinnaird Ave.
Grand Rapids Office, 533 Mich. Trust Bldg.
Jacksonville (Fla.) Office, 21 N. Ocean St.
Kansas City Office, 1321 Union Ave.
Los Angeles Office, 847 Traction
Milwaukee Office, 757 No. Water St.
Nashville Office, 178 Eighth Ave., North.
New Orleans Office, 504 Howard Ave.
New York Office 461 Eighth Ave.
Omaha Office, 1124 Harney St.
Peoria Office, 115 So. Jefferson St.
Philadelphia Office, 1541 Spring Garden St.
Phoenix, Ariz., Office, P. O. Box 145.
Pittsburgh Office, 1517 Clark Bldg.
Portland, Ore., Office, 53 First Ave.
St. Louis Office, 3104 Magnolia Ave.
Salt Lake City Office, 204 Dooley Bldg.
San Francisco Office, 4401 San Bruno Ave.
Scranton Office, 723½ Crown St.
Seattle Office, 520 Denny Way
Syracuse, N. Y., Office, Van Vleck Road
Toledo Office, 2319 Elm St.

IT is obvious that your product on its way from factory to consumer must face different conditions in July than in January. Temperature and humidity vary the year round and will affect it differently.

That your package may give full protection to its contents, from deteriorating influences under all these varying conditions, the KVP Research Laboratories were established.

Here is equipment and trained staff to determine the effectiveness of your present package, at no cost to you. We determine and advise you also as to the material that has the best protective values for your particular product under all the conditions it must face. Where this ideal packaging material is not already available we will find it for you.

Here is a real package service. Take advantage of it.

For a description of the methods and work of the KVP Research Laboratories send for this booklet.

KVP PROTECTION PAPERS

KALAMAZOO VEGETABLE PARCHMENT CO.
KALAMAZOO MICHIGAN

A PRODUCT IS KNOWN BY THE QUALITY IT KEEPS

KEEP in the quality you **pack** in. Retain all the original aroma and taste; protect it all the way to the buyer's table. This is the final test of Quality and Profit.

AND BOTH DEPEND ON THE WRAPPER!

Today markets reach farther than ever. Yet both distance and time are overcome by the use of KVP Protective Papers.

They render the most varied and exacting types of service to the satisfaction of leaders in all lines of food industry.

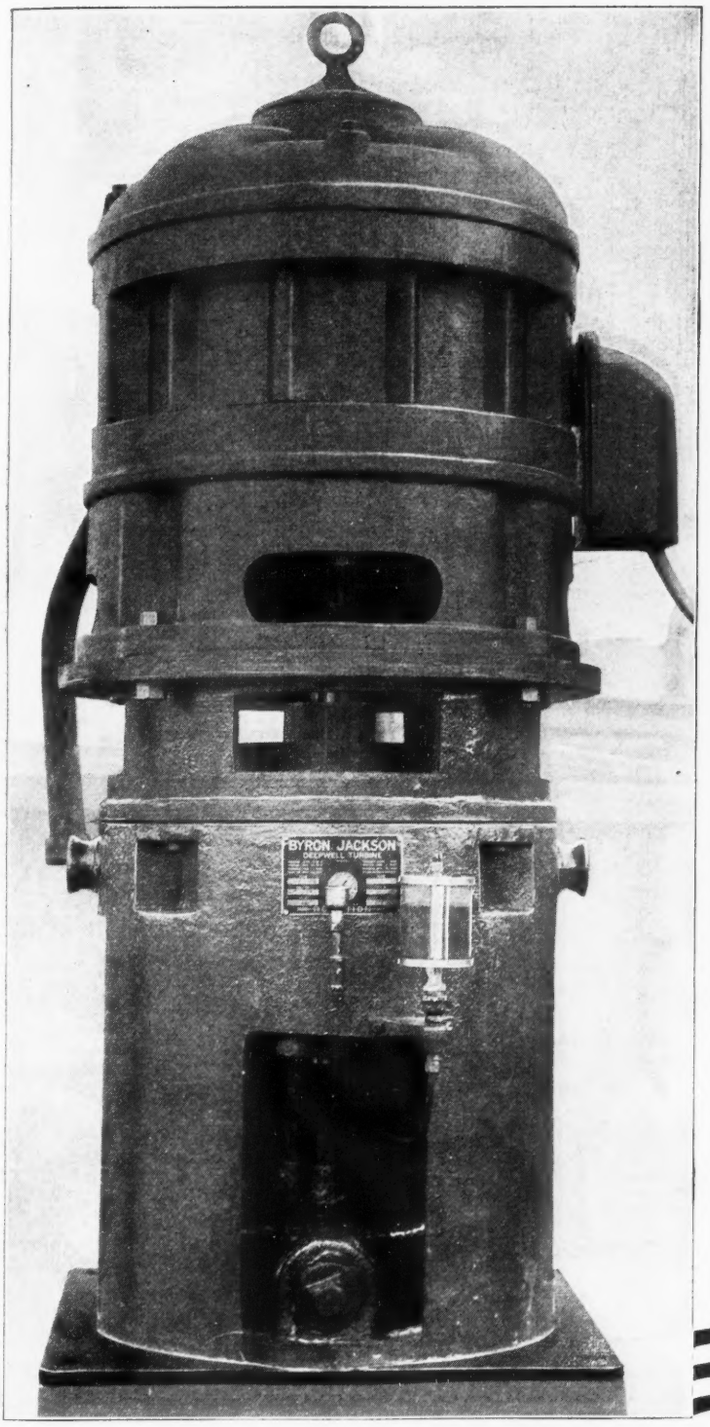
Whatever your need, you may entrust your **quality** to KVP Papers. They guard against loss of flavor and outside taint. They are odorless, tasteless and resistant to water, grease and oil.

Let KVP research engineers advise as to the best type of wrapper for your special needs. Write for information and samples.

Kalamazoo Vegetable Parchment Co.
KALAMAZOO - MICHIGAN

KVP

PROTECTION PAPERS



WATER
a vital need

In packing plants and canneries the quantity of fresh, pure water used is generally so excessive that a private water system must be installed to permit of economical operation.

The BYRON JACKSON Deepwell Turbine operates in a private water system just as efficiently and with as little operating attention as when used by a public utility. Any capacity from 10 gallons to 10,000 gallons of water per minute can be secured by a Byron Jackon Turbine from a drilled well.

For full details write for Bulletin No. 316.

Since 1872

BYRON JACKSON CO.

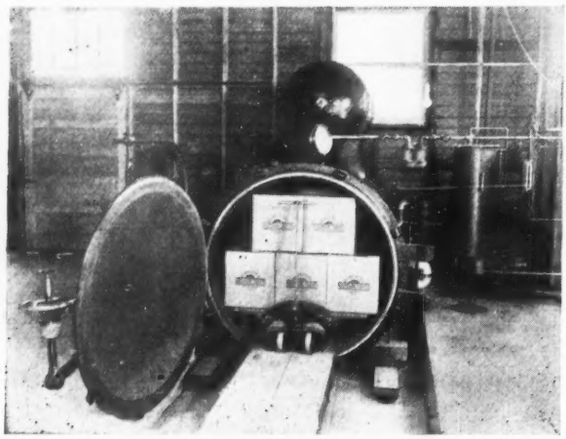
Factories: Berkeley, Calif. Bethlehem, Pa. Los Angeles, Calif.

Branches: NEW YORK and CHICAGO

Visalia, Tulsa, Detroit, Portland, Salt Lake

BYRON JACKSON

CENTRIFUGAL PUMPS FOR EVERY SERVICE



★ ★ ★ WHY NOT SEE WHAT THE Vacufume WILL DO FOR YOUR PRODUCT?

The Vacufume process destroys all types of insect life in products and commodities of all kinds.

For example, almonds grown in California are treated in a Vacufume and all insect life destroyed before the almonds are shipped.

Figs grown in Turkey are treated in a Vacufume, and the minute insect eggs, invisible to the eye, are destroyed by this unique process.

Cereals manufactured by leading milling companies are put through a Vacufume, and the insect life, which in time will develop into weevils, is destroyed.

If you manufacture any product that is subject to insect infestation, send us a sample, and we will treat it for you in a Vacufume.

Then, . . . you observe the difference between this treated product . . . and the same product . . . not treated.

Vacufume is a steel chamber. A vacuum is created inside . . . gases are allowed to circulate. Insect life not killed by the vacuum is destroyed by the gases. Vacufume design and process is patented. It does not change the flavor, texture or color of any commodity.

An illustrated booklet describing Vacufume Units, and telling exactly what they do and how they work, will be mailed to you upon request.

UNION TANK & PIPE CO., Ltd.

Mechanical Engineers, Manufacturers of Steel Plate and Sheet Metal Products.

2801 SANTA FE AVENUE
Los Angeles, California

When we say

BETTER FLOORS

we mean

¶ **floors that won't crack or break . . . . . .**

¶ **floors that can't be harmed by water, animal acids or grease . . . . . .**

¶ **floors that are easier to clean and more sanitary .**

¶ **floors that are better looking and longer lasting . .**

¶ **floors that cost much less to maintain . . . . . .**

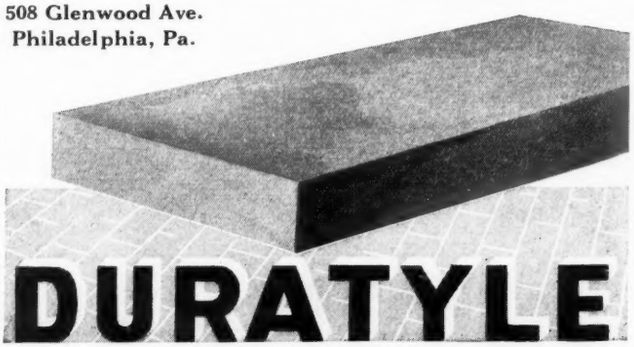
DURATYLE Floors offer all of the advantages mentioned above. In any department of the packinghouse, they solve the floor problem. That's why DURATYLE Floors are so widely known as BETTER FLOORS.

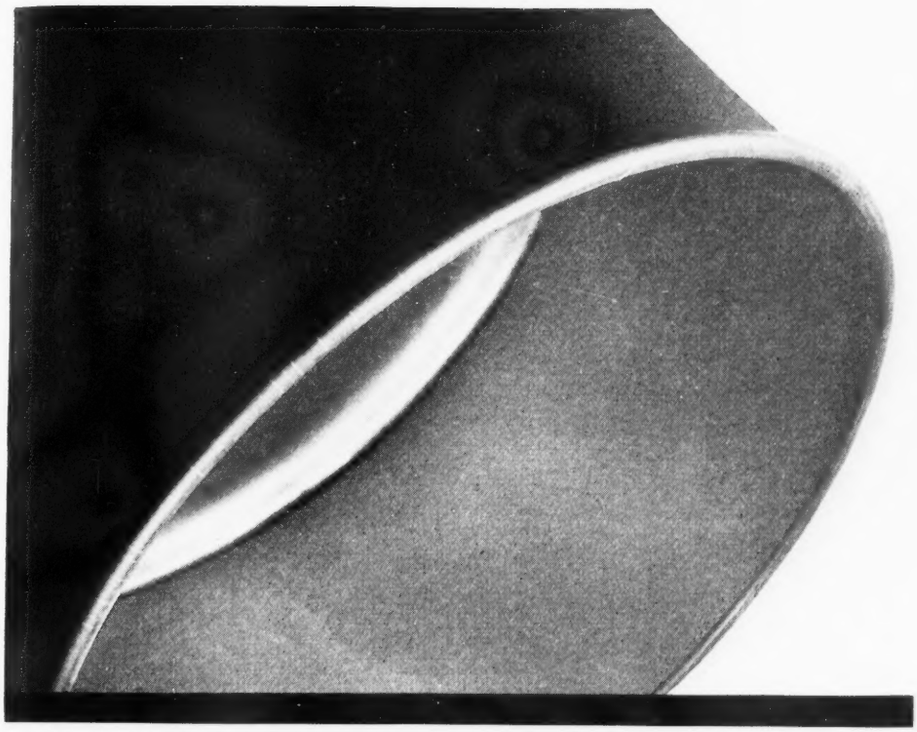
It will pay you to get the facts about this modern-day floor brick. You are seeking lowest cost all through the plant. DURATYLE will insure it when it comes to floors.

Write today for details

Drehmann Paving & Construction Co.

508 Glenwood Ave.
Philadelphia, Pa.





PROTECTO-LINE

New . . . Safe . . . Edible

THIS new edible liner brings to the food industry the safety of a steel container plus freedom from contamination. This enamel-like lining is positively neutral and does not affect odor, taste or composition of product shipped. Thoroughly tested—is adaptable to the shipment of edible oils, quick frozen fruits, juices and similar products.

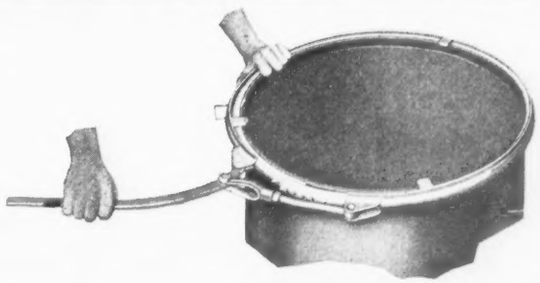
QUIK-LOX

Locking the fully removable head in place with a simple movement of the lock-lever.

NATIONAL STEEL BARRELS

Quick-Lox and Snap-Lox are two types of National Open Head Steel Drums which protect the shipper both against thieving and damage in transit.

Ease of locking, ease of cleaning, convenience of handling, air, gas and oil tight, strength, durability and high resale value are features of economical interest to you. It will be to your advantage to get all the facts. Write—Wire or Phone.

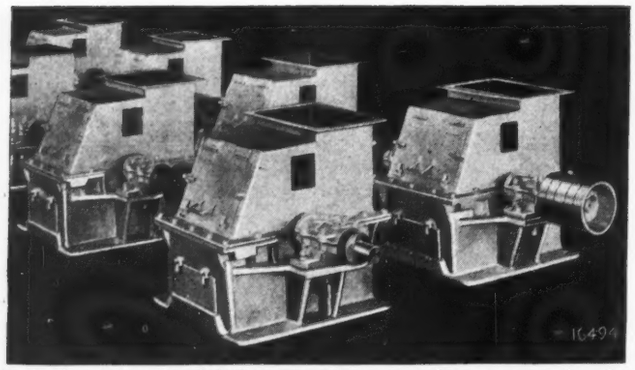


SNAP-LOX

Showing how easily the Snap-Lox rim is snapped and locked into position.

THE NATIONAL STEEL BARREL CO.....

3860 EAST 91ST STREET ··· CLEVELAND, OHIO



Part of a shipment of Jeffrey Pulverizers to a large cannery for the reduction of tomatoes for making soup.

There is an opportunity to save money with a Jeffrey Reduction Unit

Let us present an opportunity for you to save money by using JEFFREY REDUCTION EQUIPMENT.

There are operations in your plant that can be accomplished—efficiently and economically—with a Jeffrey Reduction Unit. We can cut your operating expense by installing equipment designed to meet your particular requirements.

Jeffrey Machines are designed for low maintenance and a low power consumption; and they have the ability to handle large capacities. The following list is representative of the many materials being reduced by Jeffrey Reduction Equipment.

Algaroba Beans	Cottonseed Cake	Meat Scrap
Apples—for cider and vinegar	Cracklings	Orange Peel
Bone	Egg Shells	Oyster Shells
Bread—stale	Gelatin—Dry	Sugar
Cabbage for brant juice	Ginger Root	Sugar Cane
Castor Beans	Hoofs	Salt
Coca Beans	Horns	Skulls
Cocoa Hulls	Kelp	Tankage
Cocoanut Shells	Linseed Cake	Tomatoes
	Lemon Peel	Vanilla Beans
	Meat Cake	Watermelons—for vinegar

Tell us the material you want reduced and the results required. We will be glad to recommend a machine to do the job satisfactorily and economically.

The Jeffrey Manufacturing Company
927-99 North Fourth St., Columbus, Ohio

New York	Utica	Detroit	Denver
Buffalo	Boston	Chicago	Houston
Rochester, N. Y.	Scranton, Pa.	Huntington, W.Va.	Salt Lake City
Philadelphia	Cincinnati	Milwaukee	Birmingham
Pittsburgh	Cleveland	St. Louis	

Jeffrey Manufacturing Co., Ltd. of Canada, Head Office and Works: Montreal. Branch Office: Toronto.

JEFFREY
MATERIAL HANDLING EQUIPMENT

DEAD AS A DOOR NAIL!

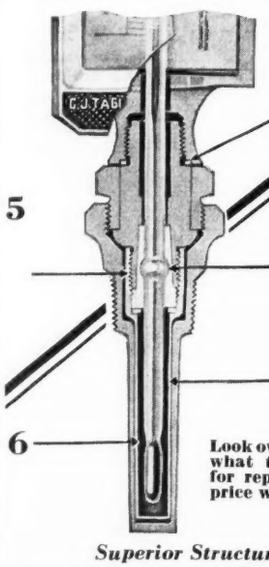
Feet up—Never again to eat into your foodstuff profits—That is the way

LARVACIDE (Chlorpicrin) REGISTERED

Kills all insects and rodents.

Learn more about this remarkable fumigant by writing today for full information about our "Control Method" of Fumigation.

LARVACIDE SERVICE, INC.,
Division
ISCO CHEMICALS
INNIS, SPEIDEN & CO.
117-119 LIBERTY STREET, NEW YORK.
CHICAGO NEW YORK KANSAS CITY



TAG
INDUSTRIAL THERMOMETERS

with NEW Snap Case-Front and other Improvements

Snap . . . The case-front of the NEW TAG Industrial Thermometer is off. No screws to bother with when removing the glass to clean it. Snap . . . it's on again . . . securely. The front can't fall as it is held firmly by a tongue and groove at the top.

Look over all your thermometers—no matter what the make—and send them to TAG for repairs . . . TAG knows how and the price will be right.

Superior Structural Features

1. TAG Red Reading Feature—easy to read.
2. Connecting piece locked to case by split spring washer.
3. Asbestos packing, compressed around enlargement on glass stem prevents movement with reference to scale.
4. Thin Monel bulb chamber allows quick conductivity, yet is rugged and non-corrosive.
5. Left handed thread on bulb chamber prevents loosening if case is turned.
6. Mercury filling in bulb chamber surrounding bulb insures split-second transmission of heat.

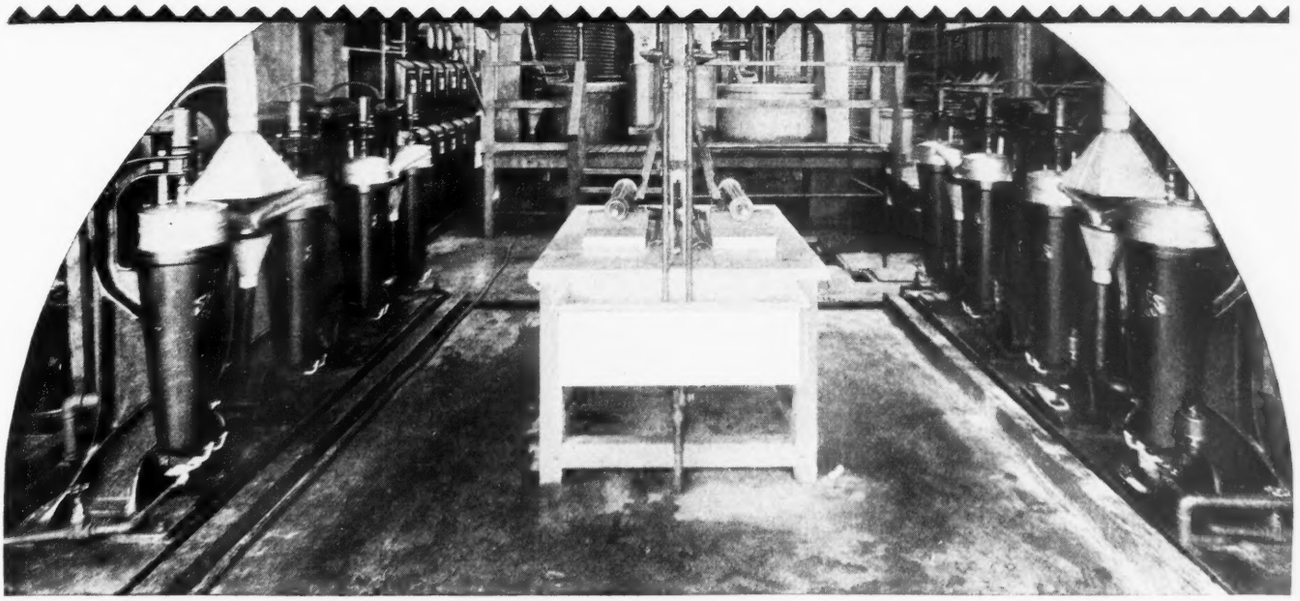
C. J. TAGLIABUE MFG. CO.
Park & Nostrand Aves.
Brooklyn, N. Y.

C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.

Gentlemen: Please mail me at once copy of your Catalog No. 440-2 on the New TAG Industrial Thermometers.

Name .....
Address .....
City ..... State .....

RECOVERING FISH OIL AND MEAL FOR "CALPAK"



This Battery of Sharples Machines Is Doing a Big Job at San Pedro

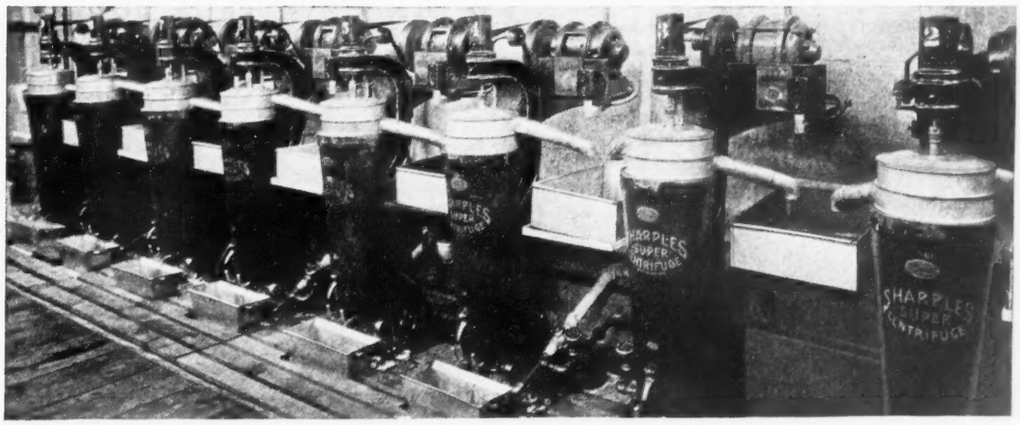
THE California Packing Corporation — internationally known as "Calpak"—has "gone Sharples" in a big way. The battery of Sharples Super Centrifuges illustrated above is installed at their San Pedro, Cal. plant, the largest plant on the Pacific Coast for the production of fish oil and meal. Sharples fish oil and meal recovery systems are also used at Calpak's Monterey and Vancouver Island plants.

Below is shown another battery of Sharples Centrifugals installed at Calpak's Olive Oil Plant at Palermo, Cal.

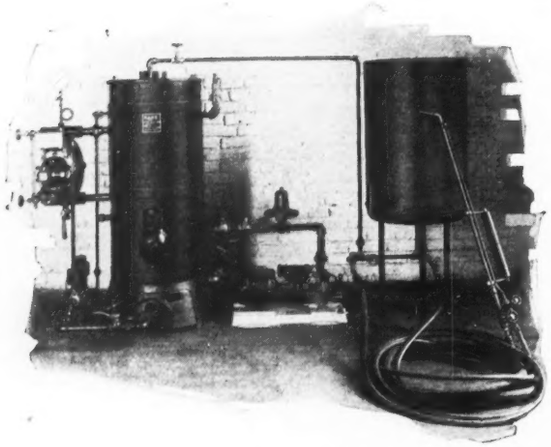
All told, a total of 31 Sharples Machines are used in Calpak's plants — for food product manufacture and for engine lubricating oil purification.

Consult Sharples Engineers on your separation, clarification, dehydration, emulsification or recovery problems. Complete tests will be performed and reports submitted without cost or obligation.

THE SHARPLES SPECIALTY COMPANY, 2315 WESTMORELAND STREET, PHILADELPHIA. Boston, New York, Pittsburgh, Chicago, Detroit, Tulsa, San Francisco, Seattle, Los Angeles, Toronto. Factories in England and France.



for Removing—
Dirt, Grease or Old Paint from Your Trucks



—A one-gun assembly made completely self-contained and automatic by the M-K-O high pressure boiler feed system. There are sizes to take care of as many spray guns as desired. YOUR DELIVERY SYSTEM IS A VITAL PART OF YOUR "SALES SERVICE." Use this KANE UNIT in preparing for that smart new paint job!

—Gas-fired steam proves its almost inexhaustible resource once again: High-pressure steam used with a chemical solution removes dirt, grease, oil, and old paint from truck parts, body, and chassis more quickly and efficiently than any other method known.

And by far the most effective *complete unit* available is the KANE CLEANING UNIT, equipped with M-K-O automatic boiler feed—

Designed by makers of KANE and OFELDT Boilers, it combines the KANE boiler, automatic boiler feed, solution tank, and spray guns, into a labor-saving unit that produces a chemically clean metal surface, quickly, efficiently, and cheaply . . . BY ALL MEANS SEND FOR BULLETIN K25 AND GET DETAILS.

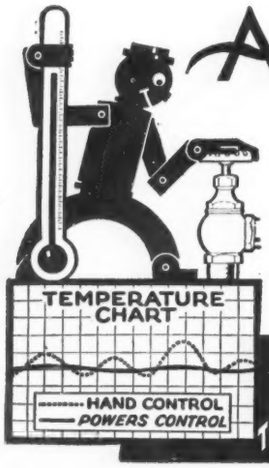
MEARS-KANE-OFELDT INC.

Executive Offices and Factory
1903-1915 EAST HAGERT ST., PHILADELPHIA

BRANCH OFFICES OR DISTRIBUTORS
IN PRINCIPAL CITIES

Makers of Automatic Gas Boilers for over a Quarter Century

• A WORD TO THE WISE • ***Hard-hitting sales executives selling the prosperous food manufacturing field will find some helpful hints on target shooting on pages 60 and 61 of this issue.***



Automatic Temperature Control

TO ERR IS HUMAN—eliminate the errors of hand control of temperature with the mechanical accuracy of a Powers Regulator. It will quickly pay for itself by speeding up production—helps you to get a still better and more uniform product, and stops steam losses due to overheating. Let our engineers study your problems of temperature control and recommend the type of regulator that will give the best results at the lowest cost.

CHICAGO—2755 Greenview Ave. NEW YORK—231 E. 46th St.

THE POWERS REGULATOR CO. OFFICES IN 40 CITIES
40 YEARS OF SPECIALIZATION IN HEAT CONTROL

(U. S. PATENTS APPLIED FOR)

TESTS—PRACTICAL TESTS—prove NYMPHRAP EXTRA (moisture-proof transparent cellulose paper) can be sealed with heat tightly enough for most purposes, thus avoiding the use of adhesives or solvents when these are objectionable or undesirable.

Wrapping and sealing on rapid automatic machines and by hand are accordingly simplified. Adhesives may be used with NYMPHRAP EXTRA when desired for either machine or hand-wrapping or for special purposes.

This self-sealing with heat, plus its moisture-proofness and its clean transparency, makes NYMPHRAP EXTRA the ideal wrapper for all food products.

NYMPHRAP EXTRA is free from tri-cresyl-Phosphate.

When next you buy or specifiy transparent cellulose investigate NYMPHRAP EXTRA (moisture-proof) and SYLPHRAP (non moisture-proof). Our technical staff will gladly assist in the solution of your packaging problems.

SYLVANIA INDUSTRIAL CORPORATION

EXECUTIVE AND SALES OFFICES : 122 EAST 42ND ST. · NEW YORK

Don't fire

McGRAW-HILL

McGRAW-HILL PUBLISHING CO., Inc., New York · Chicago · Philadelphia · Washington

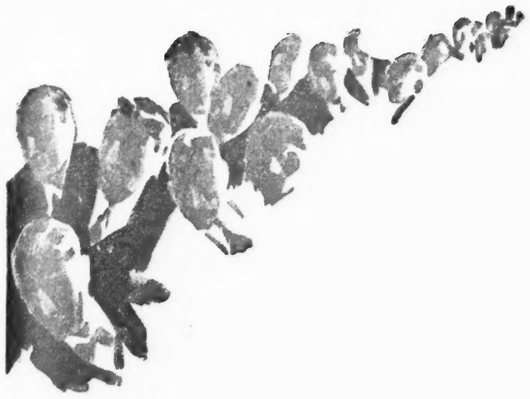
Business men, industrialists and engineers—600,000 of them—regularly read the McGraw-Hill Publications. More than 3,000,000 use McGraw-Hill books and magazines in their business.

The Business Week
System

Factory and Industrial Management
Maintenance Engineering

American Machinist
Product Engineering

Engineering News-Record
Construction Methods



until you see the whites of their eyes

When business is going full blast, when sales-promotion ammunition is plentiful, a stray shot here and there may, perhaps, be excused. But when the powder supply must be used sparingly, when every shot must hit its target, then it's time for business to heed that famous battle cry: "Don't fire until you see the whites of their eyes."

Today that time has come. Today there must be no shooting at random. Your advertising must aim at business *through the publications that reach your prospects exclusively.*

If you're selling to business or industry, McGraw-Hill publications are the ones to use. The character of their editorial content and the work of their circulation staffs have singled out, for your benefit, over half-a-million business men, industrialists and engineers — the men at whom you're aiming. In a recent check-up 69% of these executives stated that they look to their business papers for information to guide their buying.

We've lined them up for you, made it easy and economical for you to get at them. It's your move.

★1 Jobs that business paper advertising can do NOW

Here's one of ten ways in which business paper advertising can help your salesmen to get orders . . . right now.

**It can put your sales story before buyers, all over the country, frequently and cheaply.*

This, and the other uses of business paper advertising are explained in our book, "Industrial Advertising at Work." Our representative will gladly bring you a copy on request.

PUBLICATIONS

Detroit · St. Louis · Cleveland · Los Angeles · San Francisco · Boston · Greenville · London

Engineering and Mining Journal
Engineering and Mining World
Metal and Mineral Markets
Coal Age

Electric Railway Journal
Bus Transportation
Aviation
Textile World

Electrical World
Electrical Merchandising
Electrical West
Power

Radio Retailing
Electronics
Food Industries
Chemical & Metallurgical Engineering

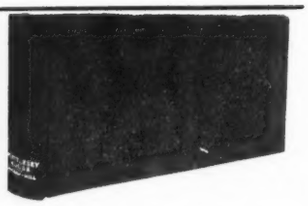
Sweeping the Country!

The Donham Plan in book form

BUSINESS ADRIFT

by **Dean W. B. DONHAM**

Is our present economic order on trial?



Here is a foresighted answer to this question—a sane yet penetrating analysis of business today and the outlook for the future. To every man who recognizes a challenge to American business in current conditions, the author addresses this survey of business ills and suggestions for an intelligent program for remedying them.

BUSINESS ADRIFT

by **W. B. DONHAM**
with an introduction by
ALFRED NORTH WHITEHEAD

A WHITTLESEY HOUSE PUBLICATION
196 pages, 6 x 9, $2.50

THE dean of the Graduate School of Business Administration, Harvard University, a business man of wide experience, looks squarely at our disorganized business structure and analyzes the problems we must meet and solve during the coming generation.

Without sentimentality, without resorting to alarmist tactics, the author presents all the facts which threaten the economic well-being of America and the world. The challenge of Russia, the fallacy of excessive dependence upon foreign trade, the need for an intelligent plan to meet changing business conditions—these are but a few of the topics which this book analyzes in the light of their effect on our economic stability.

Prescribes definite remedies for the future

This is an arresting book, a thoughtful, uncompromising book, which not merely diagnoses our commercial ills, but prescribes an intelligent plan for curing them.

Here will be found significant answers to such currently important questions as:—is unemployment a permanent problem?—is your industry keyed down to probable consumption?—should we cancel war debts and why?—what is wrong with free trade?—what desperate competitors have we?—can business really plan ahead? Frankly, every business executive should at least examine this book. It has a real message for him.

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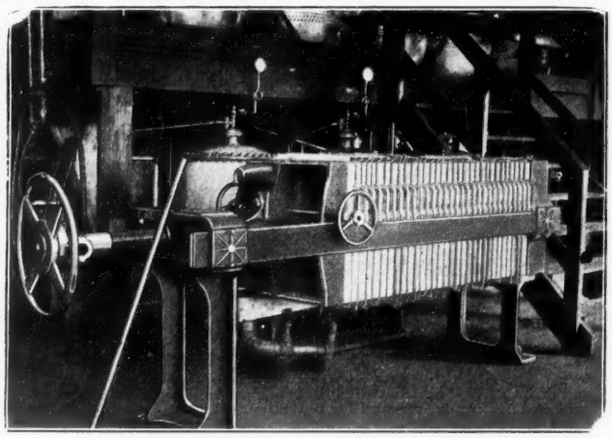

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Buffalo Nut and Food Chopper, motor drive.

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Double Pan Rack Trucks on casters.

Dough Mixers, single and double arm.

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Motors, D.C., 230 volt, 15 to 35 hp.

Steam Jacketed Copper Kettles, 10 gal. to 350 gal. capacity, with and without agitators, guaranteed steam pressure.

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Since 1855—Candy Machinery—Coppersmiths

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Send for latest Bulletins listing largest stock of Food Products Machinery, Mixers, Fillers, Dryers, Grinders, Filter Presses, Kettles, Mills, Vacuum Pans, Tanks, Pumps, etc.

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Practically New. All Sizes
50% off of list price
Mfrs. of nickel or copper coils
Copper work and re-tining of all kinds.
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in PFAUDLER steam-jacketed TANKS and KETTLES.

also Wood TANKS and CASKS, all kinds. BOTTLERS' MACHINERY, WASHERS and RINSERS, FILLING and CAPPING Machines, PASTEURIZERS and LABELERS, FILTERS and FILTER PRESSES, every size and style, ROTARY STEAM DRYERS.

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Copper, Steam Jacket, Kettles

Used Kettles 20 to 300 gallon, also new ones.

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Coppersmiths since 1836

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Copper Steam Jacketed Kettles, Dough and Food Product Mixers, Bottle Washing Machines, Copper and Glass Lined Tanks, Filters, Filter Presses, Mills, etc.

We also purchase food product equipment. What have you to offer?

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General Consulting **Processes** **Plant Design**
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Consulting Chemical Practice
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Remove Objectionable Impurities by ELECTRICAL SEPARATION

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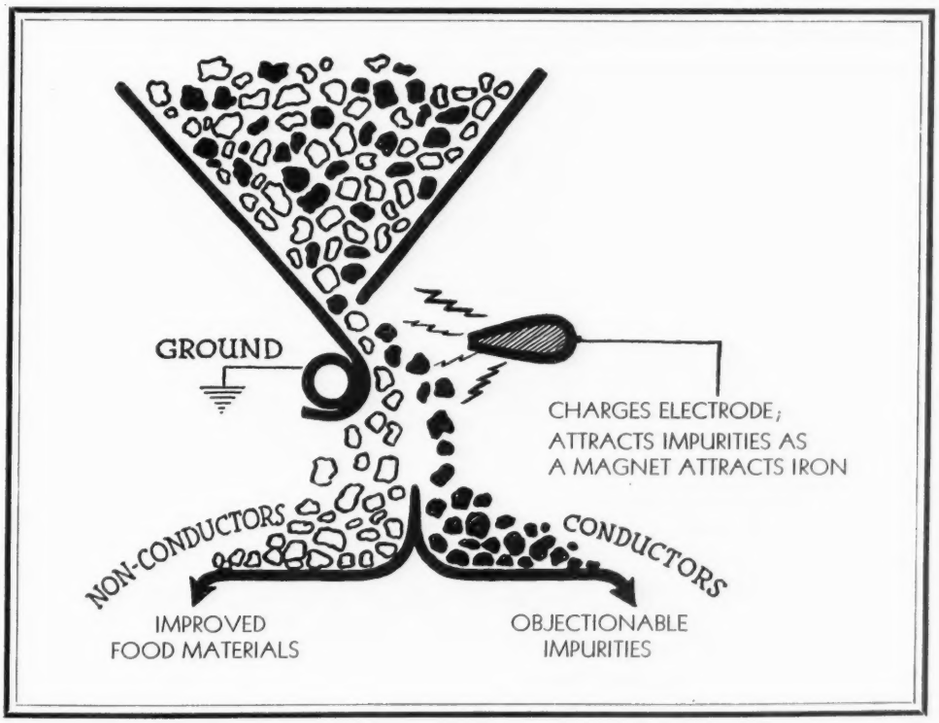


MANY good separations of food materials are made possible by a difference in electrical conductivity. To be a conductor, the material *need not be metallic,* a slight difference in surface conductivity is all that is necessary for complete electrical separation. Our machines have removed chaff from coffee, from seeds, and impurities from wheat, rice, tea, beans, peas, etc.

Low Operating Costs . . . Low Maintenance Costs

Recent installations on food products are very satisfactory.

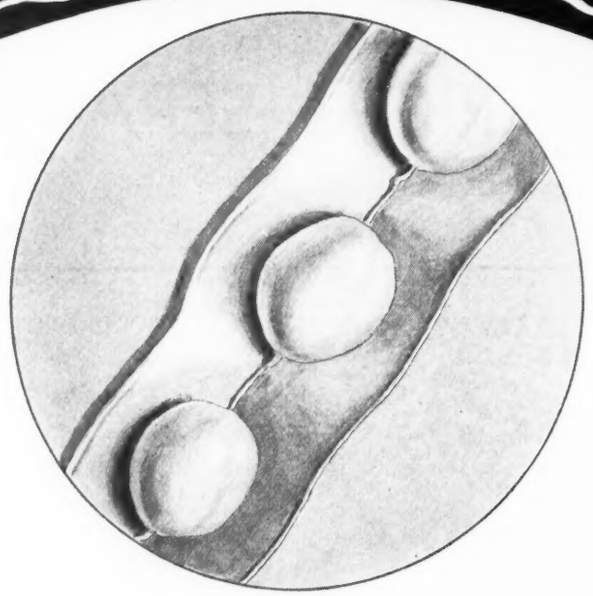
Our research laboratory is at your disposal and can give you specific information about your problem of separation.

TECHNICAL SALES CORPORATION

Graybar Building - 420 Lexington Avenue - New York

AND

CARTHAGE MACHINE COMPANY - CARTHAGE, N. Y.



Like peas in a pod . . . .

ALL *Tycos* CONTROLLED BATCHES ARE UNIFORM

USE *Tycos* CONTROL . . . . . USE *Tycos* CONTROL

Maintaining constant cooking temperatures and uniform results is next to impossible without accurate instrument-control. If you don't believe it, put a *Tycos* Recording Thermometer on a cooking kettle. Don't look at it until the batch is emptied. The wavy, erratic line on the *Tycos* chart will tell its own story of cooking inefficiency. Now install complete *Tycos* Control and forget about the batch. The *Tycos* system keeps a record, yes, but far more important it *controls the temperature* and time so that every batch is identical. It eliminates watching, guesswork, labor and waste.

Tycos

The preliminary processes of blanching and exhausting are also important and should have proper temperature control.

A new Canner's Catalog, Part 500 is just off the press. May we send a copy?

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Boston	St. Louis
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Cleveland	Detroit
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TRUCK BALLOONS

"Guarantee Prompt Service » » Anywhere"

TWO years ago the Red Star Transfer Company of Pittsburgh, Pa., equipped their entire fleet with Firestone Truck Balloons and signed up for Firestone Service. O. R. Weinert, president of this company, writes:

> **"Our fleet of 35 trucks give 24-hour service—must travel in all weather—over all types of roads—including the gruelling travel over mountain passes—*and they must be on schedule!*"**
>
> **"With Firestone Tires and Firestone Service we have been able to cut our operating costs to a minimum—guarantee on-time service *anywhere.*"**

Such results are the daily experience of Firestone-equipped fleets the country over. That's because Firestone Gum-Dipped Tires give these Extra Values:

26% ***Greater Protection against punctures and blowouts***

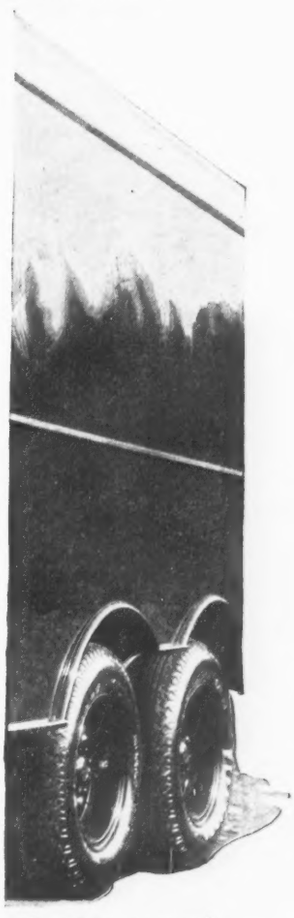
58% ***Longer Flexing life in Every Cord***

56% ***Stronger Bond between tread and cord body***

25% ***Longer Non-Skid Wear***

which gives you 25% to 40% Longer Tire Life

Whether your trucks are light or heavy—used for inter-city deliveries or long hauls, a changeover to Firestone Truck Balloons will save you time and money. See your nearest Firestone dealer *today!*



One of the refrigerated trucks owned and operated by the RED STAR TRANSFER COMPANY of Pittsburgh.

Listen to the Voice of Firestone every Monday night over N. B. C. Nationwide Network

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"Hello Calpak"...

this is MIKE* . . . calling from New York

"You folks out there must use a lot of sugar or Del Monte Products wouldn't have such sweet sales all over the map.

"So here's a suggestion. Perhaps some of the sugar you use might be better pulverized to XXXX fineness in our Mikro-Pulverizer.

"Then, too, this pulverizer grinds almost any product—fruits, dehydrated vegetables, prepared foods, fish meal, bran, dried milks, casein, dried fruit peel, pectin, etc.

"What's that? Who uses it?

"That's a fair question. Can you hear me? Then jot these down."

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American Sugar Refining Co.
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Borden Company
Bowey's, Inc.
California & Hawaiian Sugar Ref. Corp.
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Warner-Jenkinson Co.

That's enough? We can mention about 600 more if you want them—and satisfy any questions you ask as to whether or not Mikro-Pulverizer can do a better job for you, and save you a lot of money in pulverizing.

How many copies of our catalog did you say you wanted? O.K., we'll send them air mail.

* Mike — (Mikro-Pulverizer) . . . . the modern machine for pulverizing XXXX sugar and other commodities to similar fineness.

PULVERIZING MACHINERY CO.
30 CHURCH ST., NEW YORK CITY

Pulverizing Machinery Company
30 Church St., New York City

Gentlemen:
Please send me your new booklet describing the Mikro-Pulverizer. It is understood that this request incurs no obligation.

Name .....

Position .....

Company .....

Address .....

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• TO ADVERTISERS •

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EASY TO HANDLE

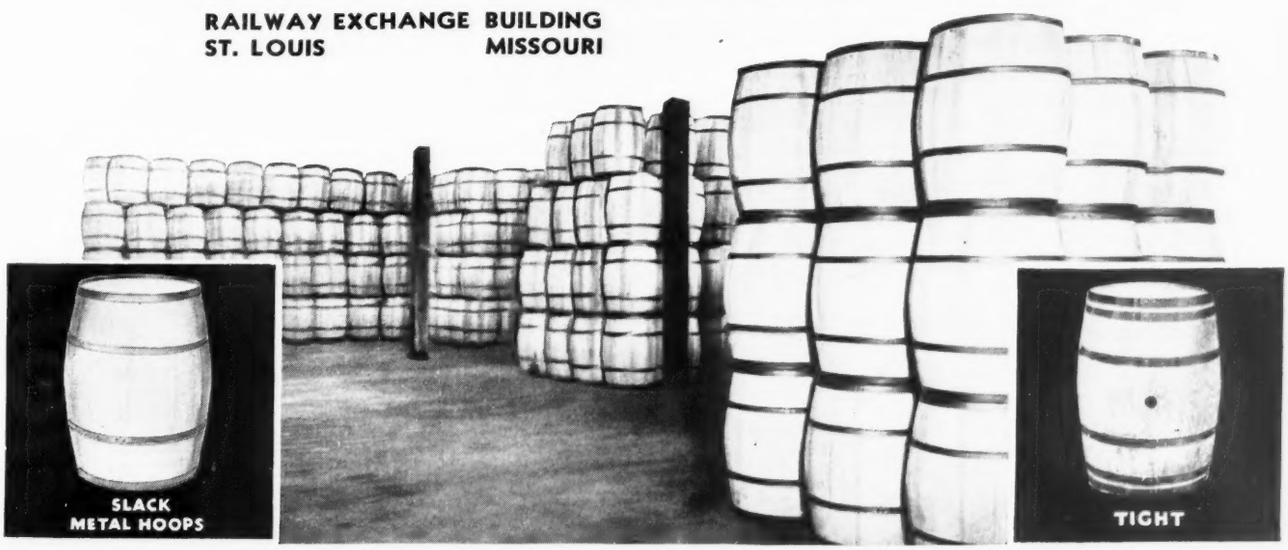
The Wooden Barrel is easily handled regardless of the weight of its contents. It responds to a push in any direction; rolled, it covers distance quickly and without much effort; on an incline, it moves of its own propulsion; and by "rocking," it can be upended at the storage point with no danger of damage to its contents. The "chime" provides an always convenient handle.

The peculiar lines of Wooden Barrel Construction are a distinct advantage in the handling of a barrel.

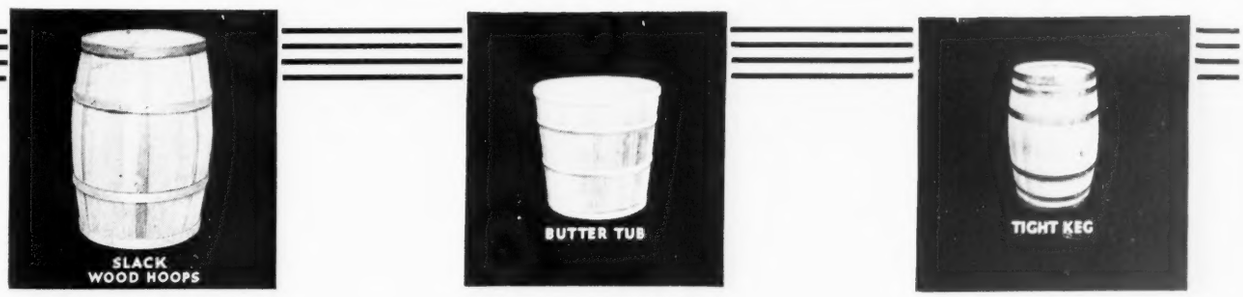
Wooden Barrels are made in various styles or types, one of which will suit your product. The Association will gladly advise you as to the barrel you need and will refer you to manufacturers.

THE ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA

RAILWAY EXCHANGE BUILDING
ST. LOUIS MISSOURI



WOODEN BARRELS



"Due to corrosive action of dough on ordinary metal . . .

"Due to corrosive action of dough on ordinary metal, Allegheny Metal is used for lining" wherever dough might touch the mixer.

ALLEGHENY METAL WAS USED," SAYS THIS MANUFACTURER

CORROSION in your equipment may harm food—and it will surely impair the equipment. The surest way to avoid corrosion is to build with Allegheny Metal.

Allegheny Metal is as insoluble as glass . . . and it cleans as easily as glass. Yet it has far greater strength than mild steel, strength to support itself without heavy reinforcement.

Manufacturers of all kinds of food are swinging to this alloy for these reasons. Many of the most famous foods are prepared in cookers and vats made of Allegheny Metal.

Undoubtedly some of your friends are now using Allegheny Metal in their processes. Call on them. Inspect their equipment. Ask their opinion of it. Specify Allegheny Metal in your next order for equipment. Send for Bulletin A.

RUST AND CORROSION *are eliminated . . . food is guarded—by the use of Allegheny Metal.*

QUICK FACTS

1. Resists more corrosive agents than any other alloy.
2. Can be drawn, stamped, machined, spun, cast, forged.
3. Far stronger than mild steel.
4. Will take any finish from dull to mirror.
5. Is non-magnetic.
6. Resists denting and abrasion.
7. Is readily annealed; may be welded and soldered.
8. Is produced in practically all commercial forms.
9. Immune to chemical reactions resulting from cooking and preparation of food . . . does not affect flavor, color or purity of any food.

ALLEGHENY METAL

Manufactured pursuant to license from the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378.

Allegheny METAL

ALLEGHENY STEEL COMPANY, Brackenridge, Pa.

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